May 1, 1941

VOLUME 104 NUMBER 2

A Bill Brothers Publication

INDIA RUBBER WORLD

CONTENTS

DEPARTMENTS

MARKET REVIEWS

STATISTICS

ARTICLES

INDIA RUBBER WORLD assumes no responsibility for the statements and opinions advanced by contributors.

S. C. STILLWAGON,
Editor

B. BRITTAIN WILSON,
General Manager

EDWARD V. OSBERG,
Associate Editor

M. L. WULFORST,
Circulation Manager

S. R. HAGUE,
Assistant Editor

Published monthly by Bill Brothers Publishing Corp., 420 Lexington Ave., New York, N. Y. Chairman of Board and Treasurer, Raymond Bill; President and General Manager, Edward Lyman Bill; Vice Presidents, Randolph Brown, B. Brittain Wilson.

A BILL BROTHERS PUBLICATION

Subscription price—United States $3.00 per year; Mexico $3.50; all other countries $4.00. Single copies thirty-five cents. Other Bill publications are *Premium Practice, Rug Profits, Sales Management, Soda Fountain, Grocer-Graphic,* and *Tires.*

INDIA RUBBER WORLD

Published at 420 Lexington Avenue, New York, N. Y.

Volume 104 | **New York, May 1, 1941** | **Number 2**

Color Measurement of Rubber Latices and Their Films[1]

G. van Nederveen

When *Hevea Brasiliensis* is tapped, the latex flows from the tapping cut as a white to cream-colored fluid, the shades of which, however, show considerable variation. Trees have even been found which yield a latex of a distinctly yellow color.[2] According to Frey-Wysseling[3] the creamy hue of fresh latex, as well as the yellowish color of the standard crepe made from it, is caused by a yellow pigment which is dissolved in the resin globules described by him. This pigment was identified as carotine by Eaton and Fullerton.[4]

A considerable part of the pigment can be removed by pre-coagulation,[5] which has its importance in the manufacture of sole-crepe,[6] for instance. A large proportion of the pigment can also be removed with the under-latex by concentration processes like creaming and centrifuging; this can also be effected by dialysis[7] and clarifying.[8]

When latex is shipped in a preserved state for the purpose of manufacturing rubber articles directly from it, it is often of very great importance for the color of the latex to be as white as possible. However, in most cases, the color of preserved latex is darker than that of natural latex, because during transportation the iron drum or tinned kerosene can causes the development of coloring substances. The color of preserved latex may be blue-gray, yellow, or a combination of both.

Rhodes and Sekar[9] assume that the blue-gray tint is caused by the action of sulphur-containing decomposition products of the albumins on the iron, with formation of FeS, which is present in the latex in a finely dispersed condition. Cotton[10] believes that the yellow discoloration is caused by the oxidation in alkaline surroundings of FeS to $Fe(OH)_3$, which is also in suspension. A mixed color is thought to be the result of partial oxidation, depending on the amount of oxygen which controls the oxidation-reduction potential of this system. According to Rhodes and Sekar, a darker color of the latex is often accompanied by an unpleasant odor, much sediment, and low stability.

It is therefore of great importance in connection with the control of latex for use as a basic material in the direct manufacture of rubber articles, to know the color of the latex and to be able to fix the limits between admissible and inadmissible color gradations. It is certainly important to discover what connection there is between the color of latex and that of the resulting rubber films.

For this reason an investigation was started on the measurement of the color of latices and their films. To this end it was first ascertained which methods are in use for measuring white colors of various products like sugar, flour, paper, etc., in general, and also which methods have already been recommended for measuring the colors of latices. It became evident that Hilger's blancometer[11] might prove to be a very suitable device for such measurements, and since this apparatus was available, an investigation was made with it.

Methods for Determining Colors

The color of the opaque latex is determined by the nature and the amount of light reflected by the surface of the fluid. Hence all methods which are suitable for measuring the colors of solid substances may in principle also be used for latex. Since latex as a rule is very light in color, those methods are indicated which are also used for other light-colored products. A short review of these methods follows.

Materials in General

Many devices are known[12] and in technical use which are capable of expressing numerically the color of a sample by comparing it with a fixed color scale. In this method the tints which are obtained by mixing different amounts of two simple colors are arranged and numbered according to a regular merging of one shade into another. By comparing the sample with this scale, the color which corresponds with the sample is estimated with the eye so that the required color can be numerically recorded.

Instead of comparing the sample with a scale on which the shades are ranged next to each other, a number of

[1] Communication No. 25 of the Rubber Foundation, Delft., translated from the Dutch by L. Thakar.
[2] Compare W. Bobilioff, *Arch. Rubbercultuur,* 5, 95 (1921).
[3] *Ibid.,* 13, 371 (1929).
[4] B. I. Eaton and R. G. Fullerton, *Quart. J. Rubber Research Inst.,* Malaya, 1, 135 (1929).
[5] Compare O. De Vries, *Arch. Rubbercultuur,* 1, 178 (1917).
[6] H. N. Blommendaal, *Ibid.,* 10, 214 (1926).
[7] G. E. Van Gils, *Ibid.,* 24, 84 (1940).
[8] R. F. A. Altman and G. M. Kraay, *Ibid.,* 24, 61 (1940).
[9] *India Rubber J.,* 87, 557 (1934).
[10] *Trans. Inst. Rubber Ind.,* 11, 89 (1935).
[11] Made by A. Hilger, Ltd., London, England, according to British patent No. 324,351.
[12] See, among others, H. A. Gardner, "Physical and Chemical Examination of Paints, Varnishes, Lacquers and Colors," Seventh Edition, New York. 1935.

small colored glasses can be piled one on top of the other, and the required color composed in this way. The light that is reflected by a perfectly white surface is then colored the same shade as that coming from the sample. The Lovibond tintometer, among others, determines the color of a sample according to this method.

This method of estimating with the eye naturally is subjective and difficult to carry out, especially where there are small differences in white or light colors, as is the case in latices. As will be seen later, no satisfactory results were obtained in measuring the color of latex and latex films with the Lovibond tintometer.

In some industries, as flour and sugar, there is a great need of accurate measurement of white shades to determine the quality of the product. Of late this need has also appeared in the textile and paper industries, for instance, to control the effect of a washing or bleaching process on almost white materials.

Originally apparatus like comparison scales, tintometers, photometers, etc., were used for these determinations, all of which were based on a subjective comparison of the color of the sample with that of the standard shade, but completely satisfactory results were not obtained in this way. In recent years apparatus equipped with a photoelectric cell has come to the fore in these industries. Such apparatus is based on the comparison of the light energy of a definite color which is reflected by the sample.

It has been found that it is possible in this way to represent by a number scarcely perceptible differences in white and pale tints. Not only does the use of the photoelectric cell give the advantage of increased sensitivity of the determination, but the result is independent of the physiological properties of the eye, so that the estimate is objective. Scattered references to a few pieces of apparatus so equipped are to be found in literature. Thus Mukhin and Kurttz[13] described an apparatus in which the light from an eight-volt lamp, after being reflected on the surface of the material to be examined, is caught in a photocell connected with a reflecting galvanometer.

Buehring[14] designed an apparatus which makes measurements with the aid of a photocell, the excited current of which is measured with a sensitive galvanometer by compensation. Magnesium oxide is used as the "standard white" surface. A few results obtained with the device and Ostwald's Universal photometer on samples of white tablelinen are compared with each other. The results obtained with the photocell are always parallel with observations with the unaided eye; those obtained with the photometer show considerable deviations.

Keane and Brice[15] describe an apparatus for determining the whiteness of sugars in which the reflected light of the sample and of the "standard white" is caught up by two separate photocells. The advantage of using two similar photocells is that the "standard white" and the sample do not have to be constantly moved about as is the case in the preceding apparatus. On the other hand, mutual deviations of the photocells are not quickly noticed; hence there is a chance of obtaining erroneous results.

According to an article in *The Vanderbilt News*[16] the effect of different fillers on the color of rubber articles can be judged by means of the Higgens[17] apparatus; while the New Jersey Zinc Co.[18] uses Steele's reflectometer[19] for this purpose. Finally Lange has put on the market a "Photo-Electric Reflectionmeter",[20] and Zeiss[21] has introduced a leukometer, which are also recommended for measuring the whiteness of fabrics, papers, etc.

A detailed investigation with the blancometer as an aid in determining white tints of varieties of paper was published by Edge.[22] This article also indicated other colors for which the blancometer appeared to be useful. Also reported are the results of measurements of the whiteness of types of paper, all of which had the same bleached cellulose-sulphate as a base, but which had undergone varying degrees of additional bleaching. The accuracy of the resultant figures, which were determined for the same samples of paper on different days, is given as 0.5% of the average reading.

As far as we know, none of the apparatus mentioned here, except the blancometer has ever been used for measuring the color of latex.

Rubber Latex

A few discussions of the measurement of the color of latex are found in rubber literature. Murphy[23] uses a comparison disk which is based on visual observation. In this device the latex is compared by direct observation with a standard yellow or gray color so that it is only possible to decide whether or not the latex in question meets requirements. Davey[24] has made a color scale from a mixture of titanium oxide, lamp black, and cadmium sulphide, which is graded according to the Lovibond tintometer. Like the Murphy disk, this scale permits a rapid, but superficial estimate.

Cotton[10] has built a device which is based on visual estimation and has the advantage of being simple and low in cost. The device consists of a small glass vessel, for holding the latex specimen, which is movable with respect to a standard white wall. Horizontal incident light from a standardized source of light is reflected by the latex and is forced to pass the front wall of the vessel twice before it is caught in a collimator. Light from the same source is also reflected by the standard white surface which is so disposed with respect to the source of light and the collimator that both incident and reflected light must pass the extended front wall of the vessel before being caught in the collimator.

From the relation—the whiteness of the latex is to the whiteness of the standard white as the square of the distance from the lamp to the latex, or to the standard white—it follows that this distance represents a measure for the whiteness of the latex. Color filters placed at the end of the collimator make it possible to determine the color of the latex both in white and correspondingly colored light.

Cotton's results are not very satisfactory. The entire division of the scale, running from latex of very good color to latex of very poor color, lies between a 40 and 35 cm. distance from lamp to latex.

The average error of observation by one person when making observations without the color filters came to 0.78 cm., and with orange or blue filters, to 0.32 and 0.38 cm. Different investigators obtain results which show still greater deviations.

Willott[25] compares color measurements of latex made by means of the Lovibond tintometer, the Donaldson colorimeter, and Hilger's blancometer. On the strength of the results obtained, the blancometer or similar apparatus is given preference.

Although the methods used by Murphy, Davey, and Cotton have the advantage of being simple and inexpensive, results obtained do not encourage their use for measuring the color of latex. From the tests described below,

[13] *J. Textile Inst.*, A. 354 (1932).
[14] *Melliand Textilber.*, 13, 137 (1932).
[15] *Ind. Eng. Chem. (Anal. Ed.)*, 9, 258 (1937).
[16] 8, 2, 5 (1938).
[17] Made by C. F. Higgens, R.F.D. No. 2, Box 61, South Portland, Me.
[18] *The Activator*, 4, 1, 1 (1938).
[19] F. A. Steele, *Paper Trade J.*, 64, 245 (1935).
[20] Made by Dr. B. Lange, Garystr. 45-47, Berlin-Dahlem, Germany.
[21] Carl Zeiss, Jena, Germany.
[22] *World's Paper Trade Rev.*, 1907 (1932).
[23] "Proceedings of the Rubber Technology Conference, 1938", London, p. 151.
[24] *Trans. Inst. Rubber Ind.*, 13, 368 (1938).
[25] "Proceedings of the Rubber Technology Conference, 1938", London, p. 169.

it will be seen that Willott's favorable experiences with the blancometer can be confirmed.

Nederveen's Measurements with the Lovibond Tintometer

In this tintometer the light reflected by the sample is visible in one longitudinal half of a tube, and the light reflected by a standard white surface, in the other longitudinal half. Both halves are separated from each other by a partition running lengthwise. By sliding small colored standard glasses into the last-named half of the tube, the white light is colored until it is judged to correspond with the color of the light that is reflected by the sample. The sample and the white surface are preferably placed in diffused light. The little standard glasses are numbered so that the required color can be expressed in Lovibond units.

The following results were obtained with the Lovibond tintometer on a few latex films composed of 100 parts of rubber and five parts of titanium oxide; for the sake of comparison the figures obtained with the blancometer and by estimating with the eye, are also given in Table 1.

TABLE 1. COLOR MEASUREMENT OF LATEX FILMS WITH THE LOVIBOND TINTOMETER

Sample No.	Color-Expressed in Lovibond Units			Reflection in White Light According to the Blancometer %	Visual Estimate
	Series No.		Unit		
1	brown	52	1.5	57.2	cream-yellow
	red	200	0.2		
2	red-brown	50	2.0	49.4	brown
	green	510	0.1		
3	red-brown	50	2.0	42.5	gray
	blue	1180	0.4		
4	red-brown	50	3.0	34.5	very gray
	blue	1180	1.0		
5	red-brown	50	2.0	52.3	brown
	red	200	0.01		

By comparison with the figures obtained with the blancometer and by visual estimating, the mutual differences of the films as expressed in Lovibond units are irregular and not large. This sufficiently indicates that, for small variations in the color of latex, this method must be considered useless for practical purposes.

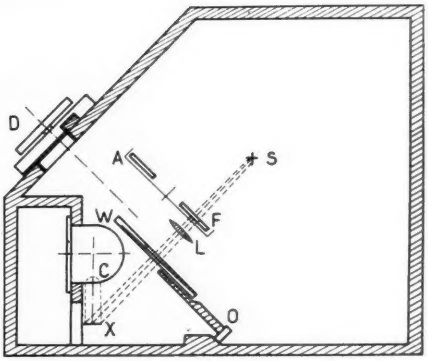
Nederveen's Measurements with the Blancometer

From the publications mentioned above, it is seen that in recent years, various pieces of apparatus are being successfully used which, like the blancometer, for instance, are based on the power of photocells to convert the energy of incident light into electrical energy. Obviously then, measurements with the blancometer to determine the color of various samples of latex were indicated, and such an apparatus was made available by the Ryksvezeldienst (National Fiber Office).[26]

Operating Principle of the Blancometer

The blancometer, of which the arrangement and the course of the light rays are shown schematically in Figure 1, consists of an electric standard lamp, *S*, two sets of double optical wedges, *W*, a movable holder for sample and standard white, *X*, and a photo-electrical cell *C*. The light of the standard lamp is always maintained at the proper intensity by controlling the applied tension. A pencil of light rays from this lamp, which is centered by

[26] It is a pleasant task to thank Ir. A. Ten Bruggencate, Director of the National Fiber Bureau, for his readiness in placing this instrument at our disposal and Ir. R. Smit, of this Bureau, for his cooperation.



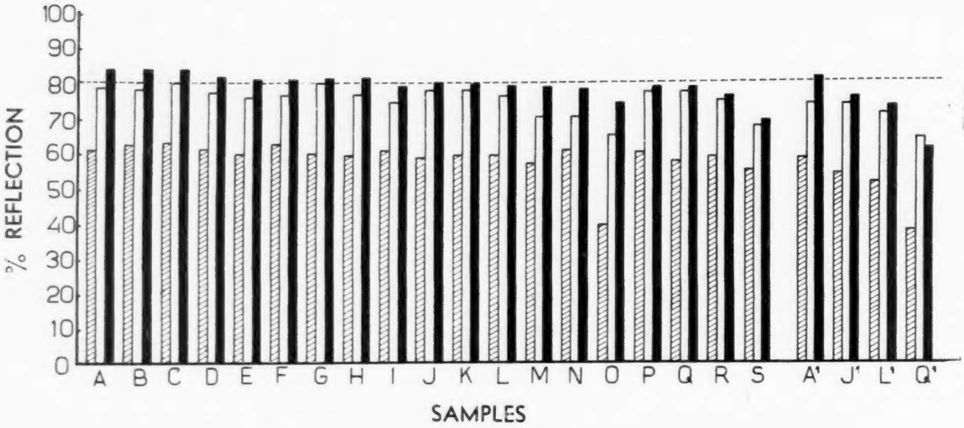
S—Standard Lamp
A-F—Color Filters
W—Optical Wedges
L—Lens
X—Movable Sample and "Standard White" Holder
C—Photocell

Fig. 1. Diagram of the Course of Light Rays in the Blancometer

lens, *L*, falls either on the standard white for which magnesium oxide is always used, or on the sample that is to be examined. After reflection, this pencil of light is caught by the photo-electric cell. The latter converts the energy of the light into a feeble electrical current, the light intensity of which is measured by means of a sensitive galvanometer. The deflection of the galvanometer needle is magnified with a microscope and can be observed on a frosted glass. The standard white and the sample are fixed to a horizontally movable slide and can be placed, one after the other, in the same pencil of light. The light that falls on the sample is dimmed by a set of fixed wedges of dark glass and after reflection is caught by the photocell. The light that falls on the surface of the standard white is dimmed by adjustable wedges of the same kind of dark glass and then likewise caught by the photocell. By moving these adjustable wedges with regard to each other, the light that falls on the "standard white" can be so dimmed that the amount of light energy which falls from it on to the photocell is equal to the amount which has passed through the fixed wedges and which has been reflected by the sample. The adjustable wedges are displaced with respect to each other by means of a worm-wheel, *D*. The number of revolutions that this worm thus makes is indicated by a recorder. The color filters, *A-F*, can be placed between the lamp and the reflecting surface; hence the reflection can be measured in blue, green, or red light as well as in white light. The blancometer used was equipped for measuring the color of fabrics, paper, and clear fluids, and therefore not for latex, which is opaque. The difficulty was overcome by replacing the sample holder belonging to the device with one in which a small glass vessel about four centimeters in diameter and one centimeter high could be clamped. The little dish was filled with latex until the surface of the fluid was on exactly the same level as the surface of the accompanying plate with the "standard white."

Instructions for Conducting Measurements

Before actual measurement is begun, the so-called zero position of the adjustable wedges is determined, that is the position which these wedges occupy with respect to each other when the light from the standard white passes through them and causes the same deflection of the galvanometer as the same light does after passing through



Solid Black—Reflection of the Latex in White Light
Unshaded Area—Reflection of the Latex in Blue Light
Shaded Area—Reflection of the Rubber Film in White Light

Fig. 2. Graphic Representation of the Results of Color Measurements with the Blancometer of Samples of Latex and Their Films

the fixed wedges. In order to fix this zero position, a second plate of standard white is substituted for the sample on the movable sample holder so that light which is reflected by a standard white surface passes through both the fixed and movable wedges. The adjustable wedges are then placed in such a position that the galvanometer shows the same deflection in both cases; this zero position of the wedges can be read on the recorder of the worm wheel. In this position the fixed and movable wedges absorb an equal amount of light; the absolute amount is determined by the nature of the glass of which the wedges are made. When the zero position is known, the second plate of standard white is replaced by the sample to be studied. By changing the position of the adjustable wedges, the reflected light of the standard white is so far dimmed that the galvanometer shows the same amount of deflection as it did in the case of the reflection on the surface of the sample and the passage through the fixed wedges. The change in the adjustable wedges is again read from the recorder and indicates how much energy these wedges have absorbed from the light color employed, which is therefore a measure of the intensity of the light reflected by the sample.

Calculation of Results

The magnitudes which appear in the calculation will be indicated as follows:

α = zero position of the adjustable wedges.
β = position of adjustable wedges when comparing the sample with the standard white.
γ = wedge constant.
I_o = Intensity of light after reflection by the standard white and after passing the adjustable wedges.
I_s = Intensity of light after reflection by the standard white and passing the fixed wedges.
I_t = Intensity of light after reflection by the sample and passing the fixed wedges.

As has already been indicated, when the color of a sample is to be measured, the adjustable wedges are always moved into such a position that

$$I_s = I_t$$

Now for the absorption of light by optical wedges whose thickness is x, the following formula applies:

$$I_x = I_a\, e^{-c_1 x}$$

in which:

I_a = the intensity of the light on entering the wedges.
e = base Napierian logarithm.
c_1 = constant of the substance.

Or, converting into Briggs' logarithm,

$$I_x = I_a\, 10^{-c_2 x}$$

in which

c_2 = constant.

In the case of the wedges of the blancometer this formula becomes:

$$I_t = I_o\ 10^{-\gamma(\beta-\alpha)}$$

Expressed in per cent. of the standard white, the light intensity (whiteness) of the sample is:

$$W = \frac{100\, I_t}{I_o} = 100\cdot 10^{-\gamma(\beta-\alpha)} = 10^{2-\gamma(\beta-\alpha)}$$

so that $\log W = 2 - \gamma(\beta - \alpha)$.

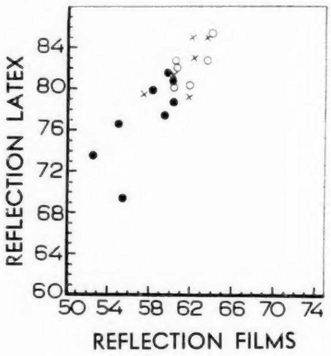
In this equation, γ is the known constant which has been fixed, while β and α are determined in the test, and hence W can be calculated.

Results of Actual Measurements

The reflection of various latices illuminated with white and blue light was determined[27] with the blancometer described above, but suitably modified for latex. Also the color was determined of a rubber film about three millimeters thick obtained by drying a mixture of these latices thickened with latekoll and containing a titanium oxide dispersion in the proportion of five titanium oxide to 100 rubber. The data obtained for these latices and films are

[27] The color filters which belong to the apparatus and which were used did not permit the reflection measurements to be brought into agreement with the values of an international color scale as worked out by the Commission internationale de l'eclairage [*Trans. Optical Soc.*, 33, 73 (1931-32); or A. C. Hardy, c.s. "Handbook of Colorimetry", Cambridge, Mass., 1936]. However, according to Willott (see note [25]) a modified model of the blancometer is now available which does permit this.

given in Table 2 and Figure 2. At the same time the color index of the latex, as estimated with the eye, is also given. The reflection in white light of latex and the films containing TiO_2 made from it is shown separately in Figure 3. The latex samples examined were of different ages and origins so that the color varied to some extent. Samples *J*, *K*, and *L* were several years old. The last two to three liters of four of these samples were collected separately from the tin in which the latex was shipped, and the color also determined. This remainder, which contains much sediment, is often darker in color than the rest of the contents of the container, provided, of course, that the tin has not previously been vigorously shaken or the latex violently agitated. One of these samples of remnants, *A'*, came from a tin the metal interior of which had a coat of lacquer for protection against the effects of ammoniated latex. The effect of this protective coat is clearly shown in the figures of this sample in white and blue light.



Estimate of the Latex with the Eye
o—white
X—creamy-yellow
• —grayish

Fig. 3. Connection between the Reflection in White Light of Latices and Films Containing TiO_2 Made from Them

TABLE 2. COLOR MEASUREMENTS OF LATICES AND FILMS CONTAINING TITANIUM OXIDE BY MEANS OF THE BLANCOMETER IN COMPARISON WITH VISUAL ESTIMATES.

	Latices			White Films
	% Reflection in			% Reflection in White Light
Sample	White Light	Blue Light	Visual Estimate	
A	85.0	79.5	somewhat creamy	62.0
B	85.0	79.0	cream	63.6
C	85.2	81.6	whitish	64.0
D	83.0	78.3	cream	62.3
E	81.9	77.2	whitish	60.6
F	82.6	77.6	whitish	63.5
G	82.6	81.3	whitish	60.4
H	81.3	75.3	cream	60.1
I	80.2	75.5	whitish	61.8
J	81.3	79.0	slightly gray	59.7
K	80.6	79.0	slightly gray	60.2
L	80.0	77.5	whitish	60.2
M	79.5	70.9	cream to yellow	57.4
N	79.1	70.0	yellow	61.8
O	75.2	65.6	yellow	39.5*
P	78.5	75.1	grayish	60.3
Q	79.7	78.4	slightly gray	58.2
R	77.2	75.7	grayish	59.4
S	69.1	69.0	very gray	55.4
	Fraction from the bottom of tins of four samples:			
A'	81.9	74.8	somewhat creamy	58.8
F'*	76.4	74.6	somewhat lighter than F'	54.8*
P'	73.4	71.9	gray	52.3
Q'	62.6	64.5	gray to black	37.9

*EDITOR'S NOTE. These unexpected ratings appear to be an error in the original manuscript from which translation was made. Although the designation F' is translated correctly, the values indicate this sample to be identical with that shown as L' in Figure 2.

The following conclusions can be drawn from Table 2 and Figure 2:

1. Latices of good color give values in white and blue light which lie close together and which are 80% or more in white light.

2. Yellow latices give values considerably lower in blue light than in white light.

3. Blue-gray latices yield figures which, while lying close together in blue and white light, nevertheless are in both cases lower than those of white latices.

4. From the comparison of the figures of latices in white light, on the one hand, and of the corresponding films made of 100 parts rubber and 5 parts TiO_2, on the other, which are shown in Figure 3, it appears that there is a close correlative connection between the reflection of the latex and the reflection of the films made thereof. The small number of points, however, do not permit the determination of a correlative coefficient. The highest values were found for white latices in white light; the reflection of the latex is approximately as high for yellow-colored latex, but in the case of the films made thereof, it is somewhat lower than that obtained for white latices; while finally the grayish latices, and especially the films, give considerably lower values.

Accuracy of the Results

The reading of the position of the adjustable wedges of the blancometer in measuring latex is given to one decimal point with a precision of 0.2. The figures for the reflection of the rubber films in white light vary more for the different positions of the same film and for different films of the same latex, as here the influence of the preparation of the films is a factor. The average error found, when measuring the reflection in white light in five different positions for four absolutely similar films, was 0.4% so that the result for these films, with an average of 56.3%, was $W = 56.3\,\% \pm 0.4\%$. Therefore, where the differences between two latices amount to more than 0.4% or to more than 0.8% in the case of two films, it may be concluded that the two latices differ in color.

Summary

At the beginning of this article a review is given of the cause of colored latex as well as the significance of color measurements in this field. The methods which have been developed for measuring the color of various "white" products, as sugar, flour, paper, etc., were reviewed as well as those for measuring the color of latex. Some of these methods are subjective; on the other hand others make use of photo-electric cells which exclude subjective observation. Some measurements of the color of latex were carried out with the Lovibond tintometer, but this apparatus was found to be useless for the purpose.

Color measurements of latices as well as of films made thereof were carried out with Hilger's blancometer. The method of measuring and calculating the intensity of reflected light of a given color was explained. The results of reflection measurements of different latices obtained in white light and in blue light with the blancometer were compared with estimates of the color of the latex with the eye. It was found that the reflection of latices of good color is about 80% or more in white light and about 78% or more in blue light. The reflection of yellow latices in blue light is considerably lower than it is in white light; gray latices give reflections in blue and in white light which do not vary much, but which, nevertheless, remain under 80% in both cases. Color measurements clearly indicate that there is a close connection between the color of the latex and white films made thereof.

We have pleasure in here thanking Dr. A. Van Rossem, director of the Research Division of the Rubber Foundation, for his great interest in the investigation here described.

Rubber in the Modern Airplane[1]

Roy T. Clay[2]

RUBBER and synthetic rubber are used in a variety of forms and compositions in the airplane of today, a few of which are sheet, tubing, molded parts, sponge, hard cellular forms, hard rubber blocks, etc.

Rubber has always had an important mission to fulfill in the airplane from its original conception. The first rubber that meets the eyes of the layman is probably the tires on the landing wheels of the airplane. In the early days much faith was placed in the old reliable shock cord; this cord was used for cushioning the landing shock, and for a variety of other purposes, such as bungees on controls, seat adjustments, suspension for radio apparatus, instruments, etc.

The original usage for landing shock absorption was to wrap numerous strands of shock cord about each end of a straight wheel axle and undercarriage strut, the weight of the airplane determining the number of strands to be used. A later method consisted of forming rings or loops of shock cord and stretching these rings over pins in stationary and movable telescoping members carrying the wheel and the axle. This method was used by Fokker on the first tri-motored transports in this country.

For the benefit of those who are not familiar with the term shock cord, it is made in various diameters ranging from ¼-inch to one inch. It is constructed of numerous strands of live rubber pre-stretched and then enclosed in a woven fabric casing in such a manner that it can be extended up to 300% of its free length. In the case of the rings or loops the strands of rubber are lapped, and a continuous outer woven casing is applied.

Applications and Functions of Rubber

In the modern airplane between 300 and 400 rubber parts having a total weight of from 50 to 60 pounds exclusive of tires perform critically important functions. The airplane industry appreciates the wonderful cooperation it has received from the rubber industry and feels sure that a great many of the present problems can be solved, but that a vast amount of research and development work is still necessary.

In the following discussion of 27 general types of usage for rubber in airplane construction an attempt is made to convey some impression as to present practices and the conditions under which rubber is required to perform the various duties.

Tires and Tubes. The airplane tire differs considerably from the automobile tire. Airplane tires are generally made with a smooth tread and are of streamline cross section; the edge above the bead blends with the wheel rim so as to form a smooth flat side between the tire and the wheels. This is done to reduce drag or wind resistance during flight. Most of the modern airplanes are designed so that the wheels are retracted into the structure during flight and only the flat side of the tire and wheel is exposed, or in other cases the section of the tire is exposed to the airflow. Landing gears on airplanes are usually designed to stand a drop test of the completely loaded airplane for a vertical distance of four feet. This test is conducted with the tires and wheels in place.

The punishment inflicted upon these tires may be visualized from the fact that in flight before landing the wheels are not rotating, but at the instant of contact with the ground the speed of the airplane may be 60 or 70 miles per hour. High friction and shock are developed under these conditions, and if you observe closely an airplane landing on a concrete runway, you may often see smoke from the heat generated during contact with the runway and the immediately following application of brakes to stop the airplane in a short run.

A blowout in a tire on an airplane, when landing at high speed, is very serious and usually results in the airplane ground-looping with considerable damage to or the complete wreckage of the airplane.

Tire sizes vary from the small tail wheel sizes of ten-inch diameter to special large sizes of five feet or greater for bombers. Pressures run from very low to high, depending upon the class of service for which the tire is designed and also upon the gross weight of the airplane. The low-pressure tires are sometimes called airwheels or doughnut tires and have very small diameter wheels.

Deicers. Ice forming on the wing of an airplane causes loss of lift and eventually will cause a forced landing or wreckage of the airplane. Deicers consist essentially of a hollow rubber covering fastened along the leading edge of the wing cellule, with sectional compartments built in and connected by tubing to a distributing valve. These compartments are alternately inflated and deflated by an air pump forcing air through a rotary distributing valve. The action of inflating and deflating these compartments or cells causes the ice to crack and break away from the wing surface.

Engine Mountings. In the early days of aviation, engines were usually mounted directly on wooden bearers and bolted solidly. This method was acceptable when engine powers were low, but as powers increased, a means of isolating engine vibration was sought.

With the advent of steel and other metal structures for supporting engines the vibration problem became more serious. At first, packing pads of woven material or brake lining were used to dampen this vibration and were replaced later by rubber pads or bushings. But as horsepower increased, a more suitable method of dampening or isolating this vibration had to be found. Some designers attempted to mount the entire power plant and accessories by means of rubber blocks attached to the main fuselage of the airplane structure. This method, while isolating vibration from the airplane structure, allowed too much amplitude at the engine and propeller due to the moment arm.

Blocks or spools of rubber inserted in holes in the rigid mount were tried. In this case the engine was drawn against rubber washers, and the mounting bolts were inserted through the rubber blocks or spools. This method was an improvement, but not entirely satisfactory, as the rubber was in compression.

A later design in which the torsional movement of the engine was absorbed by rubber in shear and the thrust taken in compression of rubber was much more satisfactory and is now used in the majority of high-power engine installations. By proper design of the rubber, which is bonded to an inner and outer cylindrical sleeve, or by building the pad into a sandwich type of mounting, the torsional resonant frequency can be controlled to predeter-

---

[1] Presented before the Buffalo Group of the Division of Rubber Chemistry, A. C. S., Feb. 28, 1941.

[2] Curtiss Airplane Division of Curtiss-Wright Corp., Buffalo, N. Y.

mined values, and resonant frequencies in other modes of vibration may be placed out of the cruising speed range. Also we can reduce transmission to the airplane structure of vibration impulses resulting from exciting forces inherent in the power plant, produced by firing order and unbalance couples of propeller and engine combination, as well as various types of motion which are subject to resonant vibration as excited by the power plant.

The first rubber bushings used in compression were designed for a natural torsional response frequency of as low as 1,200 cycles per minute by varying the hardness, placing holes of various sizes through the rubber to allow flow, and by varying the thickness.

The shear-type bushings were designed for lower torsional frequencies of 600 cycles per minute; this was possible owing to the softness of the shear type of support. However we cannot make it too rigid because of possible yawing or pitching on account of high-frequency resonant response to the exciting couples of forces applied away from the mounting bushings, or too soft on account of drooping of the engine assembly in the mounting. This then is the reason for using a combination shear and compression type of rubber mounting.

Rubber used in these mountings must be of the best grade, as it is usually exposed to heat within the engine compartment in addition to the heat generated within the rubber owing to the frequency of vibration. It is also subjected to oil fumes and oil spray. Synthetic rubbers have been tried and found lacking in rapid recovery, and they also tend to take more of a permanent set under load than rubber. The design of rubber mountings is very important in order that the spring rate and loading per square inch is correct for the particular engine, propeller, and plane combination.

INSTRUMENT MOUNTING. Airplane instruments are many, and the average military instrument panel usually amazes the layman. However they are all necessary, and in order to protect these valuable and delicate instruments from destructive vibration, the entire instrument panel is usually mounted on shock absorbers similar to, but smaller than the engine mounting types. Here again we use rubber in shear to isolate vibration.

SEALING RINGS AND PACKINGS FOR HYDRAULIC AND OLEO STRUTS. Rubber sealing rings or packings of C or chevron type are used in the hydraulic cylinders for operating landing gears, flaps, etc. and also in the oleo struts on the landing gear to absorb the shock of landing. These struts are similar to the shock absorber struts used on the modern automobile, but operate under much higher load conditions and pressures. As these struts are under pressure when the airplane is standing on its gear, the slightest leakage permits the struts to collapse. Therefore extreme accuracy for these rings and the material used therein is important.

MISCELLANEOUS SEALS. A great many seals of all types, sheet, tube, and molded parts of rubber, are used to close openings where air leakage may occur. Sometimes these seals must withstand high temperatures and are often exposed to spilled gasoline or oil, in which instances synthetic rubbers are utilized.

COWLING SUPPORTS. Engine cowling, whether it be for in-line or radial type engines, is subject to vibration and expansion due to the movement of the engine mounted in vibration isolators and to the heat developed by the engine. Usually some part of the cowl is mounted or supported on the engine and because of the moment arm the amplitude of movement is greater than that of the engine. It can readily be seen that without some means of dampening the oscillations of this cowl, it would probably shake itself to pieces or at least break loose from the airplane.

The method of supporting the engine cowl is similar to that of supporting the engine. A number of shear-type rubber bushings are utilized to isolate and dampen this vibration.

Cowling is generally built in sections to expedite removal and to provide access to the engine compartment. Because of the flexibility of the structure, these sections would chafe at the joints and in time rub through if they were not protected in some manner. Unlike in automobile construction no great clearances or gaps can be left between the section; so we resort to rubber chafing strips to prevent rapid wear on the cowling sections.

FLEXIBLE DUCTS. Flexible ducts made from rubber and fabric and sometimes of molded synthetic rubber are used to conduct air, both hot and cold, to various parts of the airplane for carburetor air, cockpit ventilation and heating, and gun warming.

CONNECTING SLEEVES. Because of relative movement between various parts of the airplane we must eliminate chafing between these parts and yet retain tight joints. Such parts as air intake for carburetors, superchargers, oil cooler and radiator air ducts, all require some form of flexible connecting sleeves or joints. These sleeves are often subjected to pressures of two to three atmospheres and are made of molded and reenforced rubber, or synthetic rubber where heat and oil vapors are encountered.

FUEL, OIL AND COOLANT CONNECTIONS. For the same reasons as given above, the fuel, oil, and coolant lines must also be flexibly connected. A synthetic rubber and fabric hose which will not be affected by gasoline, hot oil, or hot coolant (usually ethylene glycol) has been developed to form these connections. In the case of the oil system these connections must also withstand pressure up to 200 pounds per square inch. These connections are slipped over the ends of the tubes and special connections at the tanks, radiators and engines, and are fastened by means of hose clamps.

ELECTRICAL INSULATION. Although rubber is used for electrical insulation throughout the airplane, the most important application is in the high-tension ignition system. Here we have conditions that require very careful engineering. If we consider that electricity is analogous to water with pressure and flow through conductors, and the insulation is the pipe which prevents the pressure from leaking, we have a fair example. However, if we consider that in place of water we have a highly corrosive acid trying to eat through the pipes, then we have conditions under which insulation has to work to hold high-tension current. All high-voltage conductors carry the current along the surface. This tends to produce corona which breaks down the insulation by creating ozone which is a super-oxygen and the enemy of rubber. Moisture is also an enemy of rubber insulation and is produced by condensation and pressure changes. With increasing altitude the difficulty of insulating these high-frequency currents increases as the density of the air changes with altitude.

In an effort to protect the rubber insulation from oil vapors and moisture rot, a coating of synthetic rubber over the rubber was tried, but later was abandoned. Now we use a coating of tough lacquer which resists the moisture rot and is proof against corona.

TANK SUPPORTS. A good grade of gum rubber is used for lining the fuel tank and oil tank cradles and the supporting straps so as to isolate vibration and shocks encountered during landing and takeoff. If we did not cushion these metal tanks, they would leak soon as they are very light and often carry as much as 200 gallons in one tank.

FUEL TANK PROTECTION. A new use for rubber and synthetics has been developed during the present war in the form of bullet-proof fuel and oil tanks. An inner bag of a synthetic which must prevent gasoline from permeat-

ing the bag or absorbing any residue from the bag is deliberately covered with a pure latex rubber which is readily attacked by gasoline and will swell and become sticky immediately upon contact with the gasoline; outside of this is an outer covering of synthetic rubber and fabric or leather to give strength to the cell. All fittings and connections are molded of a synthetic rubber which has good resistance to swelling and is not attacked by immersion in gasoline. We then insert the entire cell in a metal container. When a bullet penetrates the tank it pierces the inner ply, and the gasoline attacks the latex rubber, causing it to swell and seal the wound. This must occur rapidly because a leak would constitute a serious fire hazard as well as cause the loss of fuel needed to get back to the airplane base.

Radio Suspension. Radio transmitting and receiving sets being sensitive to shock, are mounted in various types of shock absorbing supports, utilizing rubber in various forms. Sometimes use is made of shear-type soft rubber mountings similar to instrument mountings, and at other times sponge rubber or shock cord is used.

Shock Cord. Shock cord is still used extensively for balancing controls and as a means of counterbalancing seats, flexible machine guns, etc.

Radiator Mountings. Radiators and oil coolers are also protected from shock and vibration by the application of rubber in various forms.

Hand Grips. Various hand grips and knobs, which may be either of hard or soft rubber, are used on controls throughout the airplane.

Walkways. Rubber is used for cabin floor covering and walkways on the wings to prevent slipping and the scuffing of the wings

Battery Containers. Airplane storage batteries follow the trend of automobile batteries and are built with hard rubber cases and use rubber plate separators; spilled acid and gases are carried off by means of rubber tubing.

Grommets and Molded Parts. Wherever a line, conduit, or control passes through a bulkhead, a grommet is used to prevent chafing and to seal any air leakage. Throughout the airplane molded rubber or synthetic rubber parts are installed to act as scuppers around tank filler caps, to protect parts from dirt or from becoming jammed owing to foreign objects falling into them. A very interesting method of using rubber bellows as seals around control rods, to allow movement and at the same time stop any flame from passing through the firewall to the pilot, is now practised.

Line Supports and Clamps. All fuel, oil, coolant, hydraulic, air, etc. lines must be supported at intervals, against our two enemies, vibration and chafing. These supports must be so rigid as to cause line breakage from movement; so we again resort to rubber to cushion these supports. A metal clip is made with a molded rubber liner inside, which is wrapped around the line or tube and fastened with a screw or bolt to the structure. Where multiple tubes are carried parallel to each other, rubber blocks split in half with openings for the tubes are utilized.

Flotation Bags. The Navy uses land planes, equipped with landing wheels, for operating from aircraft carriers. Such airplanes as do not have integral flotation compartments are equipped with flotation bags constructed of balloon fabric and collapsed into a compartment inside each wing. A door over the compartment is equipped with a spring latch or release to allow the bag to eject from the wing when inflated. The bags must be light in weight, readily packed into small space, and of such size that when filled with gas, their displacement equals the weight of the airplane. They are attached to the under surface of the wing and usually are braced with flexible guy ropes to hold them in position when inflated.

A cylinder of CO_2 gas under high pressure is stowed in the airplane and connected to these flotation bags by means of tubing. The gas bottle is equipped with a quick release in order that the pilot may liberate the gas from the bottle and inflate the bags through the tubing connections as rapidly as possible when he contacts the water.

Life Rafts. The flotation bags described above do not always save the airplane, for if the sea is rough and the airplane is not retrieved by a rescue boat in a short time, the bags may be torn away from the wing or may be punctured. For this emergency the pilot is provided with a collapsible rubber life raft, which may be inflated by a small bottle of CO_2 gas carried for the purpose. The life raft is constructed of rubberized fabric and is equipped with a patching kit, a hand air pump for keeping it inflated, a small paddle, emergency provisions, and a water bottle.

Diaphragms in Carburetors and Fuel Pumps. The rubber diaphragm method of metering fuel to the carburetor and cylinders has now eliminated the old method of admitting the fuel by means of a float valve and has made possible a steady flow of fuel under pressure in any flying position.

Propeller Cuffs. Variable pitch propellers are constructed with removable blades. These blades necessarily require a round section shank where they are locked into the hub, and this round section causes a turbulent condition of air flow near the hub.

Means for increasing the efficiency of this section of the blades have been tried, and by placing streamlined blade section cuffs around the shank of the propeller blades an improvement in performance and also cooling air flow has been obtained. Molded cuffs of rubber which slip over the blade shanks have been tried and may later be adopted.

Seat Cushions. Seat cushions and backs of sponge rubber have proved practical for airplanes; the sponge-type cushions are relatively light and comfortable.

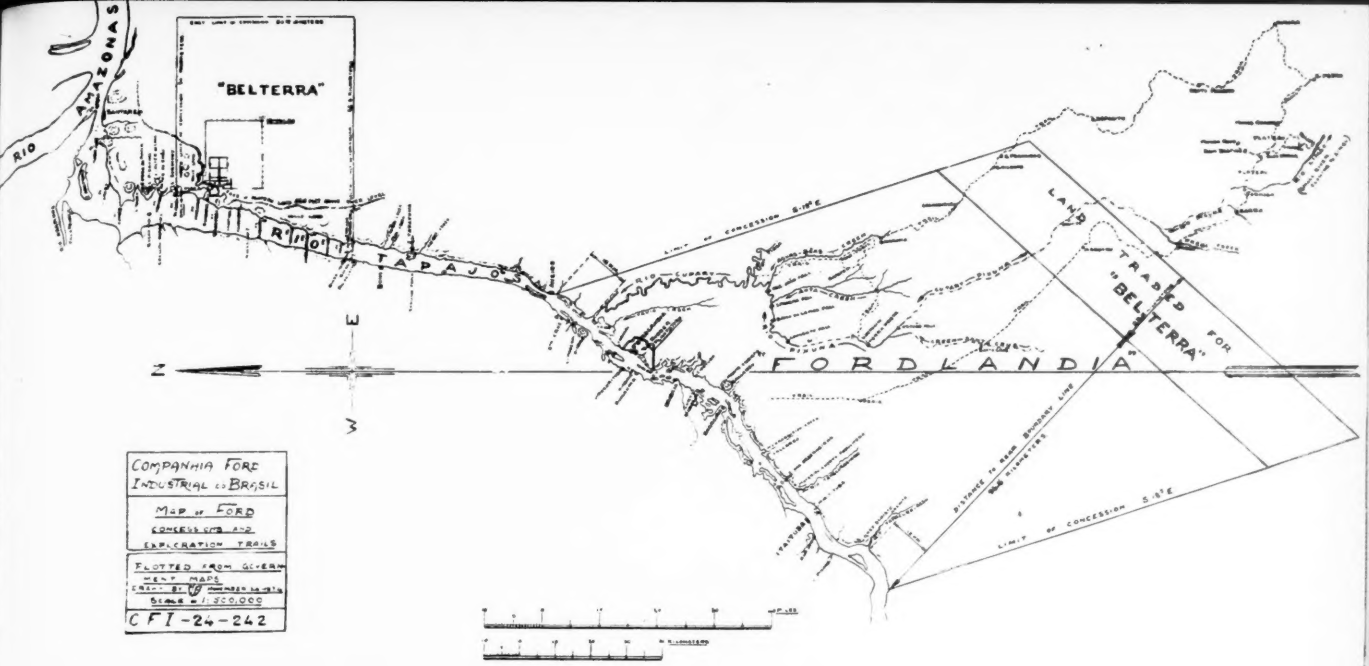
Rubber for Forming Metal Parts. The use of rubber for forming sheet metal airplane parts of aluminum and its alloys has been developed by the aircraft industry. In shearing and forming sheet metal parts, a pantograph cutting torch is used to cut out the male block in steel. The edges are then ground and finished smooth, and locating pins placed in the surface of the block. A number of these form blocks are then placed on the platen of a large hydraulic press, while several thick sheets of rubber are clamped to the upper ram of the press.

Soft sheet metal stock in gages from 0.016- to 0.091-inch inclusive can be sheared successfully with a rubber backing as can also cutouts and holes of various shapes and sizes. This blanking is accomplished by a combination of tension failure of the sheet plus a shearing action caused by the sharp cutting edge of the die. Dies for rubber shearing are torch cut from ⅜-inch boiler plate, then hardened and ground to size.

Thickness, grade, and condition of the rubber shear pad have considerable bearing on the quality of the blank produced. For shearing operations a one-inch thick pad of 70 to 75 durometer rubber has been found to be best.

In forming the parts from the sheared blanks we use forming blocks similar to those used in the blanking process with the exception that the edges are ground to a radius so as to form the bend. Where a radius flange is required on the finished part and the metal is compressed in the forming process, additional retainer blocks are added to confine the flow of rubber and prevent cracking or buckling of the flanged part. Beads of various types and sizes are formed by the rubber pad pressing the sheet metal into depressions milled into the top surface of the form block. Locating pins, which fit the same holes punched by the special locating pin on the shear die, are

(Continued on page 40)



The Ford Rubber Plantations—I[1]

THE Ford rubber plantations, Belterra and Fordlandia, are located on the east shore of the Tapajoz River which flows into the Amazon from the south of Santarem. This municipality is four hours by air, up the Amazon River from Belem, capital of the State of Para, in Brazil. Belem is south of the Amazon, on the Bay of Guajara, approximately 100 miles from the mouth of the Amazon.

Santarem is approximately 150 miles south of the Equator, 485 air miles and 592 miles by waterway from Belem. It is considered the halfway point between Belem and Manaos, capital of the Brazilian State of Amazonos. Manaos is 473 miles up the Amazon from Santarem by water and 448 miles by air. Santarem, a town of some ten or twelve thousand inhabitants, lies on the east shore of the Tapajoz and the south shore of the Amazon rivers. The plantations, Belterra and Fordlandia (formerly Boa Vista), are located up the Tapajoz River or south of Santarem, 30 and 110 miles respectively.

The Tapajoz is a mighty and beautiful river; it winds its way down through the hills and plains that intermittently line its shores. The upper end of the river is dotted with jungle-covered islands, and the whole land area bordering the river is covered with verdant jungle growth with the exception of small farm or village clearings which appear at distant intervals. One could drop Lake Houghton, the largest of Michigan's inland lakes, into parts of this clear river and still have miles of margin left over. The river is five to eight miles wide at Belterra—the lower plantation—and widens out to 14 miles at the widest point. During the rainy season the level of the river rises, and when the rains cease, it falls to the low level. The rise and fall varies with the years; the change in level is between eighteen and twenty feet.

Fordlandia

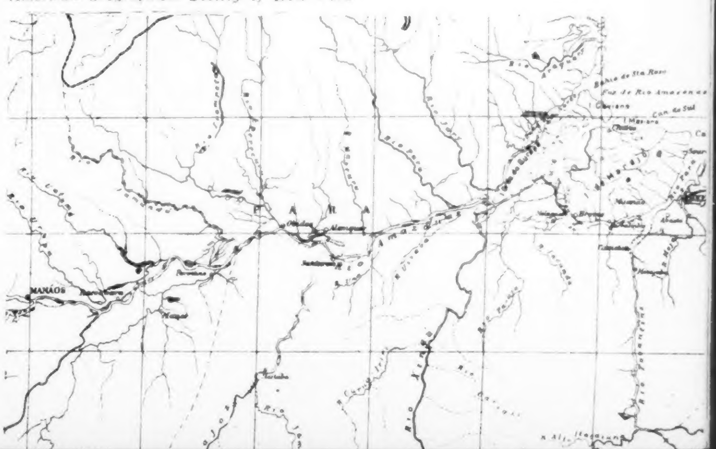
After timber cruising operations of the jungle lands, back of the east shore of the river Tapajoz, a concession of approximately 2,500,000 acres was granted to Companhia Ford Industrial do Brasil on July 21, 1927, which company had been incorporated on July 10 of the same year. A final deed of ownership on these state owned lands was issued to the Ford Motor Co. August 28, 1928. This property lies along the east shore of the river Tapajoz. The concession extends approximately 50 miles up river and 25 miles down river from Fordlandia; the back boundary is 50 miles inland. Clearing operations were immediately started at Boa Vista, and 972 acres were cleared during the balance of 1928. Temporary buildings were put up for a hospital, garage, office and stores, barracks for laborers, and a dock. During this period two miles of road were built.

The *Lake Ormoc*—a Ford Motor Co. owned boat—arrived December 10, 1928, and the *Lake Farge* docked later in this same month. Both boats were loaded to capacity with miscellaneous cargo including building materials, hardware, power house, sawmill and railroad equipment. Also food, hospital equipment, and various items and materials far too numerous to mention, including, however, a Diesel-powered tug and motor launches, were brought to Fordlandia.

Permanent construction, logging, and sawmill operations went forward in 1929. Approximately 1,000 acres of additional land were cleared, and the 972 acres cleared in 1928 were planted to rubber. An additional 1,221 acres were cleared in 1930, and the previous year's clearing

The Rubber Country of the Lower Amazon

American Geographical Society of New York



[1] Data and illustrations (except map of section of Brazil) received from A. Johnston, of Cia. Ford Industrial do Brasil, Dearborn, Mich.

Dock at Pindobal, Port for Belterra on the Tapajoz River

Main Office, Belterra

was planted. A modern city was fast taking the place of the original temporary buildings. The working force and payrolls increased rapidly. By the end of 1930 there were 3,000 employes and more than 3,000 acres of land cleared and nearly 2,000 under cultivation.

Today a power house of 2,150 KW is supplying power and light. A modern machine shop and garage, also a sawmill and water works with a 500,000 gallons capacity per day of filtered and chlorinated water are functioning. A water tank of 150,000 gallons capacity towers 150 feet above all this activity. Five miles of water lines have been laid and nearly four miles of sewer constructed. Fifteen modern buildings to house staff members, offices, and laboratory have been erected. Thirty-five houses for foremen, 107 for laborers with families, and fourteen barracks for single men have been completed. Nearly three miles of railroad, an additional five miles of hard surfaced road, and nearly four miles of plantation roads were added by the early part of 1931. Today there are over 28 miles of roads on the plantation.

A modern hospital of 125-bed capacity has been erected and furnished with the latest and finest equipment, including operating rooms and pharmaceutical and bacteriological laboratories. A sanitary crew patrols the plantation and eliminates mosquito breeding conditions.

Other projects which have been completed are: an ice plant of one-ton per day capacity; a radio station to keep in constant touch with company offices at Belem; a dock for use at low water level; a farm; a citrus fruit grove; a slaughter house; a church; schools; and stores.

With the exception of producing lumber for construction and maintenance, all logging, sawmill and dry kiln operations were abandoned early in 1933. This move resulted from governmental restrictions on certain types of trees and the high production costs prevailing because of the very hilly topography at Fordlandia. For the latter reason and many others it was also decided to look for a new location for future expansion. Maintenance and tapping costs of rubber trees located on the hillsides are excessive, and the growth of the trees is retarded. In fact, maintenance on a portion of the plantation has been abandoned, and the areas condemned. In addition to these handicaps only the smaller type river boats can navigate up river to Fordlandia during the dry season.

By 1934 approximately 8,400 acres had been cleared and 8,300 planted with 1,390,000 trees. At this time, 1,732 acres of the Fordlandia Plantation were condemned for rubber cultivation, leaving 6,444 acres on which maintenance is continued. There are 839,000 trees in this area, of which only a small percentage is budded rubber.

Fordlandia is now experimenting with topworked buddings to establish trees which not only have a high yield, but a leaf system resistant to pest and disease. When this work is done, the plantation will have a combination of three different types of tree. The root system may be of one type; the trunk is still another, and the crown or leaf system of a third type. It is hoped that the predominating characteristics in this tree will be that of the mother tree from which the trunk was budded. Budgrafting was unknown to Brazilian laborers prior to the beginning of budding operations in 1935. Five men were trained that first year, and at present 150 skilled budders are at the Ford plantations.

Experimental budgrafting was started by the rubber planters of the Far East in 1915 and 1916. It was not until the early Thirties, however, that definite strains or clones were proved as dependable high-yield trees on a commercial basis. Records showed that the yield from trees produced by planting seed was 300 pounds per acre per year; while budded trees of proven clones were yielding 1,000 to 1,700 pounds of rubber per acre per year on a commercial scale and as high as 3,000 pounds on an experimental scale.

While the original seed of *Hevea Brasiliensis* from which these clones were developed came from the Tapajoz Valley, the clones were the result of 60 years of planting of selected seed and approximately 20 years of selection by budgrafting in the Far East, as compared with four years' work at Fordlandia. For this reason it was decided in 1933 to send a company representative to Sumatra and Malay to obtain planting material of high yielding clones. After several months on the various plantations he secured 2,046 stumped buddings from 53 of the best clones in the Far East. These were carefully boxed in sterilized sawdust and started their trip from Singapore, December 15, 1933. This valuable shipment arrived in Belem, Para, Brazil, on February 5, 1934, after a trip half way around the world, via the Suez Canal and the Mediterranean. The buddings were hurried through plant quarantine and loaded on a river steamer for the last leg of the journey, 700 miles up the Amazon and Tapajoz rivers. They arrived at Fordlandia on February 15, 1934, and were planted the next day in previously prepared beds in the nurseries, within a few miles of the location that 60 years previously had produced their ancestors.

It is of dramatic interest that later in 1934 the International Rubber Regulation Committee of British, Dutch, and French rubber producing colonies was organized. One of its first acts was to prohibit the exporting of any planting materials. In the meantime, however, 1,201 of the 2,046 stumps were successfully growing, a rather remarkable percentage when the length of their transport is considered. Over 1,000 yards of budwood was ready for further multiplication by January, 1935.

For the next two years the budwood from the imported

Houses for Office and Hospital Staffs, on Main St., Belterra

stumps was used with but few exceptions, for the purpose of multiplication and the expansion of the budwood gardens. In 1937 budding in the field on a large scale was started at Belterra, which now has more than 2,000,000 budded trees in addition to 217 acres of nurseries.

View of 18-Hole Golf Course at Fordlandia

Belterra

After numerous exploration trips for a location for future expansion, a high level plateau was discovered a short distance back from the Tapajoz River and only 26 miles from Santarem. This plateau is many miles in extent and except for small "Rocas" (or farm sites) was covered with heavy jungle growth with few available trails. The exploration of this site was a tedious and dangerous task, including the work of cutting many miles of trail through the jungle. However, after thorough investigation, soil testing operations, and soundings of the river channel, the site was selected. A trade of 703,750 acres from the rear of the Ford concession at Fordlandia for a like amount of land at Belterra was effected. The new concession, approximately 31½ by 39 miles in extent, starts at a point 25 miles south of Santarem or less than 200 miles south of the Equator, continues up the Tapajoz River for a distance of 39 miles, and extends inland for 31½ miles.

Surveys were made, and corner posts or bench marks to establish correctly the boundaries of the property were installed. Camp sites were selected, clearing started, docks erected, and locations for the construction of roads to the plateau established. The first temporary camp to include a power house, temporary hospital, and housing facilities was planned before the final negotiations for the transfer of the properties were completed May 4, 1934.

The first employes at the new location were hired May 9, and contracts for clearing of the first eight blocks of 40 acres each were let on May 10 of the same year. Approximately 2,600 acres of jungle, which were felled and burned by the end of 1934, were planted with rubber during the early months of 1935. A nursery and clone garden of 131 acres, in which over 5,000,000 seeds were planted, was established. A new force of employes was hired and their training started.

A unique movable dock was constructed, on deep water at Pindobal, to take care of shipments to and from the plantation during all seasons of the year. This dock is built on two freight-car tracks; the top, covered with heavy planking, is at an angle to the tracks which bring it level or parallel with the surface of the river. Tracks were laid at low water, and the dock travels on these tracks. As the rains start and the river rises, the dock is pulled up the inclined track, toward the warehouse. In fact when shipments are received at low water, they are unloaded on the dock, and the dock, shipments, and all are drawn up to the warehouse platform. As the dock is constructed at a height even with the outer end of the platform, trucking into the warehouse is quite simple.

Although Pindobal is on company property, it is seven miles from the cultivated portion of the plantation. A number of surveys were necessary to locate and build a road leading to the plateau. However, with these difficulties out of the way, progress of clearing and planting on the level lands of the plateau was much more rapid than was possible on the hillsides of Fordlandia. Many of the difficulties and mistakes made on the original plantation were avoided as a result of the earlier experience.

Henry Ford School, Belterra

As the work progressed, villages of houses made from palm were built to care for the workers with families. These and large barracks of the same construction for single men are being replaced with permanent construction as rapidly as the program allows.

A hospital, churches, schools, stores, power house, ice plant, garage, machine shop, sawmill, woodworking shop, and stock rooms are operating. Recreation building, athletic fields, modern homes for both the American and Brazilian staff members are built. A club with pool and ping-pong tables, facilities for reading, games, and moving pictures which they have weekly are functioning: Thus we see Belterra in a period of five years forging far ahead of Fordlandia, not only in size, but as a plantation possibility. At this writing 12,230 acres are under cultivation with 2,690,000 trees planted of which over 2,000,000 have been budded with high yielding and high quality clones.

The plateau on which Belterra is located is 576.6 feet above sea level and 525 feet above the river level. Today Belterra has 18 telephones connecting the outlying posts of the plantation with the office by 19 miles of line. There are 43½ miles of hard surfaced roads and approximately 100 miles of spraying lanes through the rows of trees.

Water System and Power House

The Belterra water system has a deep well unit (for emergency use only) and a spring fed reservoir. The reservoir unit is below the plateau and is equipped with a series of pumps which boost the water over 600 feet at the rate of 140 gallons per minute, or 8,400 gallons per hour, to the two supply tanks of 50,000 gallons capacity each, towering above the plateau. The water, which is piped to supply all homes, commercial, industrial, and maintenance divisions through 20½ miles of pipe lines, is tested several times a week by the medical department for the presence of any injurious bacteria. An automatic chlorinator in the system is an extra precaution which is rarely needed.

Temporary Palm Cottages, Belterra

Palm Hut and Prize-Winning Flower Garden

Laborer's Palm Hut among Budded Rubber Trees, Belterra

The power and light plant is equipped with two 90-KW, 2,400-volt, 60-cycle, three-phase generators, each of which is driven by a 140-HB Diesel engine. Fuel is supplied from a series of five fuel tanks with a total capacity of 20,000 gallons. The voltage is transformed to 440 volts for light and home consumption. During 1940 consumption of energy ran much higher than the 276,600 KW.hrs. used in 1939. From an ice machine, of one ton per day capacity located in the power house, ice is supplied to employes at half the price charged in Santarem.

Hospital and Sanitation

Any enterprise carried on in the tropics must be attended by strict medical and sanitation measures. These precautions, which were taken from the time of inception of Ford plantations, have always been under the supervision of an American doctor who is trained and assigned to the plantation by the Henry Ford Hospital in Detroit, Mich. All other members of the staff are natives of Brazil.

While the hospital at Fordlandia, a modern brick and stucco structure, has a 125-bed capacity, there are but 40 beds in constant use because of the curtailed plantation operations. In addition there are two first-aid stations at outlying camps and one in the village. There is also a sanitary inspector who supervises sanitation throughout the plantation. The total personnel comprises 30 carefully trained employes in charge of a national physician. The surgeon from Belterra proceeds up river when operations are necessary.

The hospital at Belterra is a modern frame structure which has recently been expanded to a capacity of 100 patients, with increased facilities for the care of women and children. Four first-aid stations at outlying points of the plantation are, as at Fordlandia, in charge of competent men nurses. A doctor makes the rounds at a regularly scheduled time each day and persons requiring the doctor's care report for treatment during this period. One of the stations located in the most densely populated areas is equipped with a dental clinic where the school children and adults report for dental examination. The total personnel at the Belterra hospital numbers 41, making a total of 71 persons employed in the medical and sanitary departments of both plantations.

All medical, dental extraction, and hospital expense contracted by workers in the lower wage brackets is borne by the Ford company, while only a slight charge is made for the hospitalization of the dependents of the salaried and higher paid employes. Owing to the high standard of sanitation maintained and the continuous educational program on proper diet, hospitalization has been greatly reduced, and health conditions at the plantations are equal to any to be found in Brazil. Because of these high health standards and the free distribution of milk to babies, infant mortality has been greatly reduced and compares favorably with conditions existing in the temperate zones.

Medical inspection of incoming boats and of all meat sold in the plantations is required; while all prospective employes undergo medical examination. The families of sick employes are supplied with food when unable to supply their own needs. During 1939, 2,132 persons were hospitalized, and the out-patient departments administered to 4,270 additional patients, giving a total of 21,500 treatments of various kinds. In addition the dental department has performed over 11,000 extractions since it was organized two years ago.

Schools

The three schools at Fordlandia have six teachers and a combined enrollment of 166 students. In addition English is taught to a class of 16 young Brazilians.

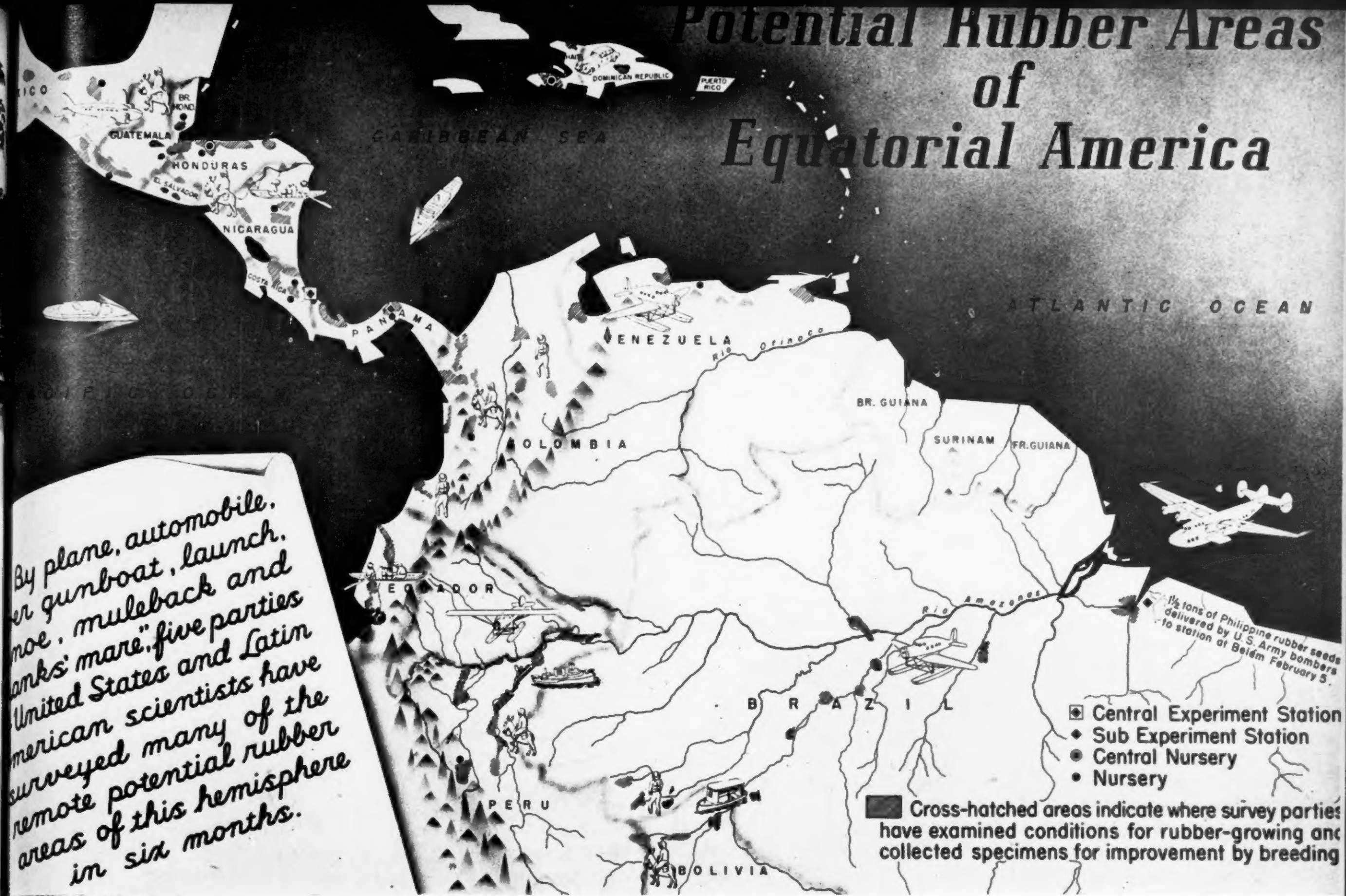
At Belterra there are three major and two outlying schools with a total of 958 students enrolled during 1940, including a night school of 49 pupils. An additional 306 children of school age were to have been ready for school in January, 1941. In addition three night classes in English are held at Belterra, with a total enrollment of 105 students; each class has lessons two nights a week.

The schools at Belterra, which are all under company control and expense, are supervised by a principal who has a staff of 16 teachers. The scholastic standards maintained are higher than those required by the regular state operated schools. The course of study is equivalent to that required for junior high school entrance in the United States, although this course is divided into but five grades. School is in session six days a week, with three months' vacation during October, November, and December. Students and teachers have but one session daily. In the areas where all of the children cannot be accommodated in the morning, school is held in the afternoon. The schools each have a playground with the usual equipment found in the playgrounds in the states. The Edsel Ford School, and the Benson Ford School now being built, will also have a football field.

Housing

At Fordlandia are 228 houses, 24 of palm and 204 of permanent construction, with a total capacity of 283 families. Also are 16 permanent barracks to hold 960 single men, 12 in the village and four in outlying camps. The village barracks, of brick and stucco, have Robertson rubber-treated metal roofing, and the ones in the camps are of wood with the same-type roof. Of the houses in the American staff village five are brick and stucco, three are wood, and all have tile roofs, tile baths, electric refrigeration, and screened porches, and are modern in every respect. A club and swimming pool are on top of the hill; while a golf course and concrete tennis court are at the foot of a street lined by mango trees.

(To be continued)



A Plantation Industry for America[1]

SIX-MONTH entensive surveys of equatorial America's potential rubber producing areas have done much more than show that cultivated rubber can be produced there. By means of wide plant collection and assembling at strategic points, production actually has been started. In viewing the immediate prospects of American rubber cultivation in contrast with Far Eastern conditions, a few important facts must be borne in mind: rubber trees in the American jungle occur usually not more than one to an acre, whereas the trees in the Far East are closely spaced for convenience in tapping and other economies; trees in the East have been improved to yield five-fold or more of the average amount of latex given by unselected jungle trees; the indigenous American plant disease has retarded regimentation of wild rubber trees in this hemisphere.

Rubber surveys were conducted in the Americas, Africa, and the Philippines in 1923-27 by the United States Bureau of Foreign and Domestic Commerce, Department of Commerce, and the Department of Agriculture. Private plantation rubber enterprises were then launched in Liberia on the west coast of Africa; on the Tapajos River in South America; and later in Central America. Despite heartbreaking obstacles, these enterprises are still on their feet.

The second deficiency bill, passed by Congress, June 22, 1940, provided a half million dollars "to enable the Secretary of Agriculture to conduct investigations directed toward the development of rubber production in the Western Hemisphere, including production, breeding, and disease research; surveys of potential rubber producing areas; establishment and operation of experiment and demonstration stations in suitable locations; acquisition of land for such purposes; construction of necessary buildings. . . ."

A plan covering a three-year program of action was completed in the first days of July, and the day the money was available, the plan was approved and put into effect. Programs of cooperative effort by mixed commissions in each of 15 Latin American countries were arranged by cablegrams in July. By the end of the month the parties to carry out the program were equipped and instructed and ready to depart for the tropics.

The decision was made to assemble all available high-yielding clones of *Hevea* for rapid multiplication of budwood at central propagating stations in Honduras and Haiti and to establish seedling nurseries in all cooperating countries for reception of Budwood. The high-yielding clones were obtained in the form of budded stumps produced on modern plantations in various parts of the world.

Several rubber planting companies, including preeminently the Goodyear Rubber Plantations operating in the Philippines and Central America, have cooperated in providing technical advice, rubber-sheeting machines for small growers, and invaluable budwood and clonal seed.

The boat carrying the first shipment of budded stumps arrived in Honduras in November, 1940. The trees were in fair condition, and 60% of them now are vigorously growing at the propagation station. Other orders quickly followed, and the stream of this material is rapidly increasing.

The ultimate distribution points, from which the com-

[1] Abstracted from "Rubber on the Rebound—East to West", by E. W. Brandes, *Agriculture in the Americas*, Apr., 1941, pp. 1-11.

mercial plantations are expected to radiate, are the local nurseries and demonstration stations in the cooperating countries. It was necessary to make careful choice of locations, acquire and prepare land, provide seed, and launch these enterprises concurrently with the acquisition of budded stumps because seedlings at least a year old must be available to receive buds from the superior clones when the latter are ready for distribution. Rather than wait for the seed crop of each country, arrangements were made to interchange seed. Thus seed was shipped by air express from Haiti to Brazil and planted 2½ months in advance of the seed season; later a return seed shipment from Brazil supplemented the nursery stock in Haiti. Nursery propagation stations have been established in 12 countries, and nearly a million seedling trees are growing.

In its native environment, in mixed stands in the forest, *Hevea* is only lightly attacked by its indigenous fungus leaf disease; but when closely spaced in nurseries or plantations, epidemic conditions are set up, and mass defoliation frequently takes place, often resulting in death of the trees. Because of differential responses of individual *Hevea* trees to this disease, trees may be selected or bred for intensification of resistance to leaf blight as well as for higher yield, etc. The disease will inevitably follow the host plant to the East, where it has been disregarded in breeding, and thus an unexpected advantage may result for disease-resistant *Hevea* in the Western Hemisphere.

In attacking the disease problem five courses are open: (1) use tolerant *Hevea* strains now available; (2) test and select or breed more resistant ones; (3) plant in the still disease-free areas; (4) use direct control measures, as dusts and sprays; and (5) plant in environments where the natural conditions are unfavorable for epidemics.

At present there are three headquarters for original biological research. In the countries visited by the survey parties, collections of superior *Hevea* seed and budwood were made and divided for planting within the country and shipment to the central research stations. The survey parties also sent miscellaneous biological specimens (diseases of *Hevea* and related plants, insect pests, soils, etc.) for examination and study. Other features of the work of survey parties were setting up of cooperations for future joint effort and examination of lands for nurseries and plantation, and the gathering of a wide variety of agricultural and economic information.

The purpose of the surveys, completed in March, was not to discover that plantation rubber production in this hemisphere can be successful, but to start the job in a material way with full recognition of the major problems involved. It was a foregone conclusion that the purely agronomic and plant-disease problems that come with cultivation can be solved. Also it is certain that the rapid development of rubber production in the Western Hemisphere can best be promoted if a balance of large and small plantings similar to that of the Far East is realized, but with initial experimental plantings by the interested corporations. Several plantations already in operation serve the purpose in a limited way, but further "inoculation" of choice areas is much desired.

Material for circulars and the press on disinfecting, handling, and germinating seed, planting in nursery beds, transplanting, budding, etc., has been prepared and distributed to cooperating government agencies. Modern methods of preparing No. 1 smoked sheet have been demonstrated; drawings of sheeting apparatus have been submitted to local machine shops for duplication; and designs for simple home-made smoke houses are available. Changing of outworn systems of rubber gathering which long have retarded progress is one of the pledges on the Chief of State of the largest country in Amazonia.

There should be no lack of frankness in discussing the facts and the prospects for Western Hemisphere rubber production to which we are committed. It takes two years to start plantations, plant seeds, grow nursery seedlings, bud, and transplant—and five years more before tapping may commence. Nothing can accelerate the normal pace of nature.

Rubber in the Airplane

(Continued from page 34)

used on form blocks.

The type, grade, and condition of the rubber in the forming pad vitally affect the quality of flanges and beads produced. A four- to five-inch pad of 55 to 60 durometer rubber yields the best results.

Synthetic Rubbers and Their Characteristics

The characteristics and properties of rubber and synthetic rubbers should be discussed before we leave the subject of rubber in airplanes, as the selection of the proper compound and type is important, depending upon the conditions of operation.

Electrical Properties. Rubber, we know, is a good electrical insulator. There are times, however, when we desire a surface to be a good electrical conductor in order to carry off surface static charges. One instance is the rubber fuel tank. Here we have a serious hazard with gasoline and static electricity. Some of the synthetic rubbers are fair conductors of surface electricity, and their use is desirable in such a case.

Strength. Strength is not always a design factor, but is desirable. Some synthetic rubbers are lacking in strength as compared to vulcanized natural rubber, and others have a bad tendency to cold flow.

Swelling in Liquids and Permeability. Resistance to swelling and permeability in compounds, such as gasoline, oils, greases, alcohols, etc., is desirable for airplane parts in general, although in some cases, such as tanks, we do not desire this feature.

Aging and Temperature Resistance. Resistance to aging and extreme temperature ranges is desirable in rubber or synthetic rubbers for airplane use. Rapid and extreme temperature changes are encountered when an airplane leaves the ground and climbs to high altitudes.

Extending Conveyer Belt Life

In many instances where conveyer belts are loaded on one side, and the loading is not distributed over the full width, the belts wear out much faster on that side. Such belts are frequently discarded when they still show comparatively little wear on the other side. To extend the life of a belt where the point of loading cannot be shifted to the other side, simply turn it "end for end." The material being loaded will then strike and wear the unworn side, and the belt need not be discarded until that side is also worn out. Bearing the above in mind it is obvious that there is an advantage in not loading a belt in its center because turning a center-worn belt through 180° will not provide an added belt thickness.

Rubber Adherence to Aluminum Through Brass Plating

Krome-Alume Aluminum Plating Process in the Plant of the Eastman Kodak Co., Rochester, N. Y.

Raymond F. Yates[1]

THE adherence of rubber to many metals through the agency of brass plating, is well understood as it is now common practice in the rubber industry. In the instance of adhering rubber to aluminum, however, developments have been somewhat slower because of the absence of a practical method of depositing brass or any other metal upon aluminum or aluminum alloy surfaces. In the absence of a practical plating system for aluminum, manufacturers of rubber mechanical goods naturally turned toward the use of various cements.

Brass-plated aluminum intended for rubber adhesion is now available for a large number of important applications in the rubber mechanical goods industry. The fabrication of certain rubber-covered rollers is a case in point. Shock absorbing mountings are still another. Except in a few isolated instances this metal has not been practical for this field. Methods proposed for the deposition of brass have, in the past, been costly and impractical, involving extraordinary and expensive procedure in plating technique.

About four years ago a new system of plating aluminum was introduced by Krome-Alume, Inc., Lockport, N. Y. This system is now in wide use throughout the United States, not only by job platers, but by some industrial companies. Recently the rubber industry has turned to this method of rubber adherence, and during the past year much experimental work has been terminated successfully so that the process is now being used for this purpose.

Aluminum in the past has been difficult to plate not only because of its electro-positive nature, but also because of the rapidity with which oxide films are formed upon exposure to the atmosphere. These oxide films are very difficult to remove, and even if removed by chemical treatment, new films are established instantly upon exposing the aluminum to the air.

Methods for plating aluminum proposed in the past have involved chemical methods of producing a deeply etched surface so that the plating would be keyed into position. Essentially this is mere mechanical adherence, and such methods are no longer in use.

The Krome-Alume Process for plating aluminum involves electro-chemical anodizing of the metal as a preliminary step. By anodizing, reference is made to the establishment of an aluminum oxide film through electro-chemical means. The aluminum articles to be plated are first placed in an oxalic acid bath and subjected to the passage of alternating current ranging between five and fifty volts. This treatment is carried on for about eight minutes, and an anodic or oxide film approximately 0.0005-inch thick is created. This film is exceptionally hard and resistant. In this condition, it is essentially a non-conductor of electric current, and before it is able to take on any electro-chemically deposited metal it must be subjected to a second chemical treatment wherein the anodic coat is rendered conductive. This second chemical treatment is carried out by dipping in a solution of one of three very ordinary chemicals. The time element usually ranges from thirty seconds to five minutes and depends upon the alloy to be plated.

After this treatment has been completed, the aluminum article may be plated in any ordinary plating bath such as nickel, brass, copper, zinc, cadmium, gold, or silver. Very little is known as to what actually happens during this so-called modification of the anodic coat, but it is known that aluminum so treated will act much as any other metal acts when it is being deposited with a platable metal. Deposition in any case proceeds at a normal rate, and after the preliminary treatment has been completed there is no difference between the cost of plating aluminum and that of plating steel, brass, zinc, or copper. By the use of this process brass may be plated directly to aluminum surfaces from ordinary cyanide solutions, or it may be plated over aluminum that has been covered with nickel. Here again the rate of deposition is normal.

The pre-plating preparation of the surface of aluminum involves not only inexpensive chemicals, but inexpensive apparatus as well. Inasmuch as the anodizing is accomplished with alternating current, ordinary step-down transformers are employed rather than the expensive direct current generators normally used in the establishment of anodic coats. A transformer with a secondary tapped for voltages ranging between five and fifty is necessary to prevent a heavy current flow when the anodic process is initiated. Here five volts are used for a few seconds to prevent heavy current surges. After the five volts have passed for a few seconds, a sufficiently heavy anodic coat is established so that higher voltages may thereafter be used to accelerate the formation of the coating. Anodizing continues for eight to ten minutes, depending upon the alloy to be treated.

For small production a 200-gallon tank of oxalic acid together with a five kilowatt transformer is usually quite sufficient. Installations throughout the country now in-

(Continued on page 43)

[1] Vice president, Krome-Alume, Inc., Lockport, N. Y.

The Kolok Process

A Latex-Fabric Development[1]

FABRICS, particularly wool and silk, are given markedly improved properties by the Kolok process,[2] a recent development of the United States Rubber Co. The name of the process, Kolok, implies a coherence and locking together of the fibers in the fabric. This is achieved without appreciably affecting the appearance and feel of the fabric by the use of a specially prepared iso-electric bath of latex.

Process

The successful operation of the Kolok process depends upon the neutrality of charge on the individual latex particles and, thus, upon the preparation of a stable iso-electric latex bath. Because the iso-electric point of a colloidal dispersion is one of minimum stability, precautions are taken to avert coagulation. Certain protective colloids and surface active ingredients are used, which permit the iso-electric pH value to be shifted within wide limits. In the case of the Kolok process, this usually means a shift from an electro-negative pH value of 9-11 to 2-4.

A further consideration is the charge of the fabric itself, which may be either positive or negative. Negatively charged rubber particles in suspension, characteristic of ordinary latex compounds, would be repelled by a negatively charged fabric, and might be coagulated or deposited on the surface as a film in the case of a positively charged fabric. The converse would be true with positively charged latex particles. Because of the iso-electric or neutral character of the bath involved in the Kolok process, the deposition of particles in the fabric is non-coagulative and non-repelling. The union between fibers and rubber particles is one of sorption—and the sorptive power is such that, after a brief aging period, a wet set occurs without heating or drying, and the fabric may be freely rinsed without the loss of deposit.

As in dyeing, there is a saturation limit for any given fiber. The saturation value of a fiber for latex depends on: the character of the fiber, its cleanness, the chemicals in the bath, and the temperature involved. Other factors to be considered in deposition are the time and the intimacy of contact.

Application to fabrics may be by spreading, immersion, padding, suction, or spraying. Modifications are possible in a number of respects so as to make the process suitable for many conditions.

The amount of latex solids to be taken up by a given type of fabric can be governed by adjusting the concentration of bath and by controlling the processing operation. For example, if it is desired to treat a woolen fabric so that a 15% increase in weight is obtained, the fabric can be passed through a 15% concentration latex bath in such a manner that the fabric will contain several times its weight of the bath after immersion. The fabric can then be passed through squeeze rolls, adjusted so that it will leave the nip containing an equal weight of latex bath. When the bath is allowed to exhaust upon the fiber, the resulting fabric will, of course, contain the desired 15 parts of latex solids and 100 parts of fiber.

Effect of the Kolok Process on the Shrinkage of 100% Wool Socks

Before laundering both untreated and treated socks appear as the one on the left. The two on the right have been laundered 50 times. The center sock has been Kolok processed; while the one on the right has not

Characteristics of Treated Fabrics

Although particularly suited to the treatment of wool, the Kolok process is also applicable to silk and, to some extent, rayon and cotton. Work with these other fabrics, notably rayon and cotton, has been found to be more exacting.

In general the characteristics of fabrics treated by the Kolok process as compared with the same untreated materials are: longer life, decreased shrinkage, increased resistance to abrasion, better resistance to stretch deformation, moth-proofness, and improved laundering properties. Under ordinary conditions, fabrics treated with latex are stiff, harsh, and have little resemblance to the original material. This is not so in the case of the new process, and it should be particularly noted that fabrics, after being subjected to the Kolok process, retain their original appearance, warmth, and handle, and in some cases these characteristics are improved.

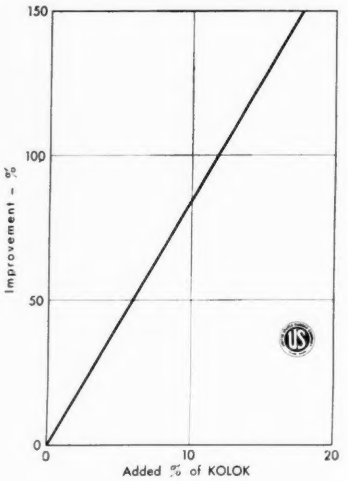
Kolok-processed fabrics, which will wear twice as long as untreated fabrics according to laboratory tests, have been made into men's suits. Such suits fit better, appear neater, retain their size and shape, and have a firm handle and a strong elastic return. The tailoring qualities of the fabric, fraying resistance and cutting, are also improved.

Automobile upholstery fabrics containing 7½% latex solids on the weight of the fabric showed a 10% gain in tensile strength and a 100% gain in abrasion resistance, and a test on 60 automobiles confirmed that the processed fabrics had twice the life of the same, but unprocessed materials. In service tests, fabrics already in use were treated and tested. In other work, new fabrics were designed and treated to reduce the net cost.

Wool blankets treated with 12% latex solids showed a 50% increase in tensile strength and a 50% increase in abrasion resistance, were substantially shrink-proof, and did not felt. On repeated launderings the blankets showed a maximum loss in area of 10% as compared with the

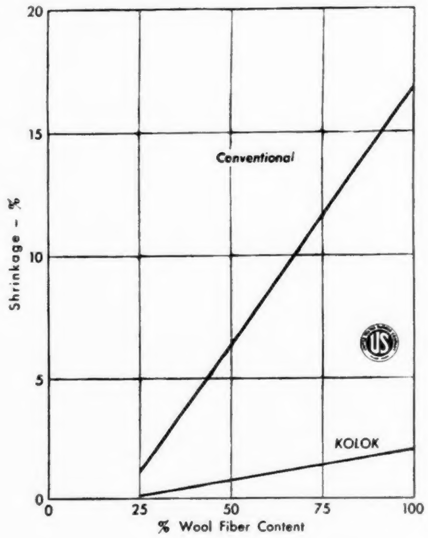
[1] Based on talks by M. C. Teague, United States Rubber Co., 1230 Sixth Ave., New York, N. Y., before the Indianapolis Section, A. C. S., at Indianapolis, Ind., on Feb. 14, 1941, and before the Seventh Annual Chemurgic Conference, Chicago, Ill., Mar. 27, 1941.

[2] Covered by U. S. patents.



Average Abrasion Resistance of Wool Socks

This chart shows how the wearing quality is markedly improved by increasing the percentage of Kolok



Average Shrinkage of Wool Socks

In untreated socks shrinkage increases sharply with increased wool fiber content; while increase in shrinkage is relatively slight in the case of Kolok-processed socks

usual 40%, and a maximum loss of 7% in weight against the usual 20%. Moreover the texture was improved; instead of a long loose nap, the blankets had a short but full and uniform nap.

The process has also been adopted for the treatment of wool, cashmere, and wool-cotton socks. In one case of cashmere socks, there was a shrinkage of 25% without treatment and only 4% with treatment. The Kolok-treated socks also wore about 75% longer. Woolen underwear subjected to the process showed a reduction in shrinkage from 10% to zero. All woolen fabrics were moth-resistant after treatment.

The Kolok process has also been adapted to the treatment of ladies' silk hosiery. It provides a permanent finish, makes the hosiery sheerer in appearance, and appreciably increases its wearing qualities.

Rubber Adherence

(Continued from page 41)

volve transformers ranging anywhere from five to 100 kilowatt capacity.

The tank for the oxalic acid can be an ordinary steel or wooden tank lined with suitable plastic materials or rubber. Experience with the process shows that the rubber-lined tank, although having a slightly higher initial cost, is by far the best suited to the process.

The tank used for the modification of the anodic coat should be of the same size as the tank used for the production of the anodic coat. The articles being plated are rinsed in clear water between the operations in the anodic tank and the modification tank and also between those in the modification tank and the plating tank.

Experiments conducted in the rubber industry have shown that the tensile strength of the bond, when rubber is attached to brass-plated aluminum, was approximately twice that of the bond resulting from most cements and in most instances was greater than that of the rubber itself. Specific tests have been made where the bond between the brass and the rubber had not yet been broken when the rubber itself ruptured at 3,610 pounds' pull.

Although the work has not as yet gone far enough to make available figures on comparative costs, it is the belief of those who are familiar with the process that the cost of brass plating aluminum will be substantially less than that of covering it with any of the known cements. If nickel is used as an undercoating, the costs are about double, but still in good competitive position with the cement method.

The amount of brass needed for good rubber adherence to aluminum is no greater than that needed for adhering rubber to any of the other metals. Even with the anodizing included, aluminum can now be plated with brass for rubber adhesion in from 20 to 22 minutes. Some variation in the time element is needed for the peculiar action of aluminum alloys when being anodized.

By means of the use of this process aluminum is rendered available for certain uses which become rather important in view of the armament program. For instance there are certain cases where it has been desired to adhere rubber to aluminum for application in the aviation field. It now becomes possible to substitute aluminum for steel with very substantial reductions in weight.

Experimental investigations have also been conducted in connection with the deposition of chromium on aluminum molds for the rubber industry. Results to date have been most encouraging, and several authorities have expressed the opinion that plated aluminum will eventually replace untreated aluminum in the fabrication of rubber molds of all kinds. Not only does the deposition of nickel and chromium in these molds greatly increase their life, but it also adds to the appearance of the product. This process has also been applied with some success to forms used for the production of latex articles.

Dilex dispersing agent, made by Horn Research Laboratories, Inc., is refined sulfolignin, developed especially for latex and said to have a low electrical conductivity and low water absorption in the finished product. A liquid of 35% solid content, Dilex is non-toxic and has a brown color and pleasant odor. There are two forms, Dilex-A and Dilex-B. Dilex-A acts solely as a dispersing agent and is used for materials which of themselves are not strongly water repellent. Dilex-B is a combination wetting and dispersing agent for dispersing highly water repellent materials.

EDITORIALS

I Am An American Day

THE President of the United States, at the request of Congress, has appointed Sunday, May 18, as I Am An American Day. The principal objective of such a designation and observance is the recognition of the privileges afforded by citizenship and the accentuation of the duties and responsibilities which rest upon those who attain citizenship in the United States. I Am An American Day is presumed to be of special significance to two new groups of citizens: those who have been born in the United States and have recently attained the full rights of citizenship by reaching their twenty-first birthday; and those who, having been born in foreign countries, have been inducted into the full rights of citizenship by a naturalization court.

However this observance should have a profound significance to every man and woman in the United States; to those who have been citizens for many years and even to those grown people of foreign birth who have not signified their intention or have not yet met the requirements for recognized citizenship.

Particularly in these times of world disorder and regimentation each person with at least a normal mind can scarcely fail to recognize the advantages of living in a free country which is not being subjected to the devastations of war. Assuming that such recognition of fact does exist, it is difficult to conceive that anyone would intentionally obstruct the preservation and furtherance of the existing benefits. The only understandable excuses, not legitimate reasons, for such action lie in misjudgment of the proper means of extending the desired conditions or in selfishness or a desire for personal gain.

Yet, there are many persons, although of a small proportion, who are deliberately or unknowingly delaying or obstructing the measures which are a part of our national program and which are generally recognized as necessary to the preservation of the benefits derived under our way of living. The success of the immediate program of preparedness, which has been definitely determined, depends entirely upon the speed and thoroughness with which it is to be consummated, and this in turn is dependent upon the unity of purpose and the wholehearted, unselfish support of the people as a whole. America has set a production task for itself, and that task will be accomplished. However, speed is of the greatest importance, and delay or obstruction cannot be tolerated. The utmost production can be accomplished only through cooperation between the workers and managers. The objectives of both groups must be the same, and united understanding and action are necessary. Stoppage of defense work through agitated strikes must be eliminated. If unity of purpose cannot otherwise be obtained, it becomes the duty of government and public opinion to remove impartially from a position of influence those who create dissension.

The observance of I Am An American Day on May 18 can well serve to emphasize the benefits which we now enjoy and the urgent need of sound judgment and total cooperation in our national undertaking. Each and every American can well ask himself, "Am I helping or hindering the national program for the production of goods intended for the preservation of my country?"

Conservation through Standardization

SOME discussion and many rumors relate to the possibilities of alleviating any shortage of delivered natural rubber which might occur. Practically all of these refer to reserve stocks, substitution of synthetic or other materials, or curtailment in the manufacture of products now utilizing rubber. Actual stocks of natural rubber in this country and afloat continued through March to increase month by month even though actual consumption was raised by the usage in defense equipment, but the steady diminishing of ship tonnage available throughout the world points to an impending problem if a normal supply of rubber products for commercial use is to remain available.

However, much rubber can be conserved without curtailing the availability of finished products by standardization and consolidation so as to eliminate certain styles, sizes, and brands of finished products. By such an instituted practice the inventory of finished goods and therefore of rubber in product form can be proportionately decreased without changing the relation between the demand and the effective stock of finished goods. This saving of rubber will, of course, not be continuous, but with the usual flow of crude rubber to this country the reserve stocks of rubber will be increased in proportion to and during the reduction of total finished goods inventory.

Likewise the consolidation of product items will enable a greater proportion of mass production on individual items and thereby result in more efficient manufacturing practices. Through such a course there will be a saving in man-hours, machine-hours, floor space, and supervision required to take care of requirements. Because of the fact that standardization and consolidation must necessarily be gradual, the increase in relative manufacturing capacity because of inventory reduction will be spread over a considerable period of time and therefore not have any tendency to disrupt the industry. If the recent rapid increase in consumption of rubber goods is to continue, there will soon be a need of the installation of considerable new equipment, and with the approaching shortage of skilled mechanics who constitute the bottle neck of machine production, it is even more important that the greatest possible advantage be taken of possible standardization.

S. C. Stillwagon

EDITOR

What the Rubber Chemists Are Doing

Rubber Division Active in St. Louis

THE meeting of the Division of Rubber Chemistry, A. C. S., held at the Hotel Statler, St. Louis, Mo., April 10 and 11, was a marked success, both technically and socially. F. W. Frerichs, of the Cupples Co., local committee chairman, and those assisting him should be commended for the able manner in which they arranged for the Division's activities, particularly the banquet which was attended by nearly 400 members and guests. The papers presented at the symposium and regular technical sessions, abstracts of which were previously presented here, were of a high character and a credit to the Division, its members, and Chairman R. H. Gerke.

E. B. Curtis, chairman of the Goodyear Lecture Committee, announced that David Spence would give the first memorial lecture at the fall meeting, the subject to be announced later. Mr. Curtis, also head of the Nominating Committee, submitted the following names to be voted on by letter ballot: chairman, J. N. Street; vice chairman, J. T. Blake and F. H. Amon; secretary, H. I. Cramer; treasurer, C. W. Christensen; sergeant-at-arms, Ralph Appleby and C. P. Hall; executive committee, G. S. Haslam, C. R. Park, Harvey Doering, P. K. Frolich, and Norman Bekkedahl. C. R. Haynes, chairman of the Membership Committee, reported a net increase in membership since September of 34.

Crude Rubber Committee Report

G. A. Sackett, chairman of the Crude Rubber Committee, presented two testing procedures for later adoption by the Division. The first was for testing plasticity, and the second for testing water absorption.

Differing from previously proposed tests, the plasticity is determined at three different degrees of milling and is believed to reflect more accurately the behavior than in the instance of a single determination. A 300-gram sample is placed on a standard 12-inch laboratory mill, with the flow of cooling water adjusted to maintain a temperature of 115 to 120° F. The opening between the rolls is exactly 0.04-inch as determined by using lead slugs. The sample is passed through the mill ten times; five times adjacent to each guide. Each time it is rolled and inserted endwise in the mill. After the sample has then been milled continuously for three minutes without cutting, the rubber is cut across the mill, rolled, again passed lengthwise through the mill and rolled. This is repeated twice, after which the sheet is folded to the proper thickness for testing and chilled in tap water at 60 to 70° F. for five minutes. Testing must be carried out within 24 hours of milling. The milling operation described above is repeated twice with 300-gram portions of the original sample, duplicating each operation exactly except that the second portion is allowed to run six minutes and the third portion nine minutes.

The actual tests may be carried out on either the Williams plastometer or the Mooney shearing disk plastometer. The Williams plasticity test should be made at 158° F. with a preheating period of 15 minutes at 158° F. and using a five-kilogram weight. The Mooney test is for one minute at 100° C.

In the water absorption test an 800-gram sample is milled ten minutes on a standard laboratory mill, at a roll temperature of 155 to 160° F. with the rolls set at 0.075-inch opening using lead slugs. The sample is cut continuously and is then placed in Holland cloth and cooled 24 hours. A two-inch by five-inch sample is died out, and the Holland cloth carefully removed. The sample is weighed to the nearest one-tenth milligram and folded in a piece of ten-mesh aluminum wire. It is immersed in distilled water for 20 hours at a temperature of 158° F., removed, and blotted lightly to remove excess water. It is dried in a stream of air at room temperature and weighed to one-tenth milligram. The increase in weight is the water absorbed and can be expressed in per cent. or in milligrams per square centimeter.

Prize Donors

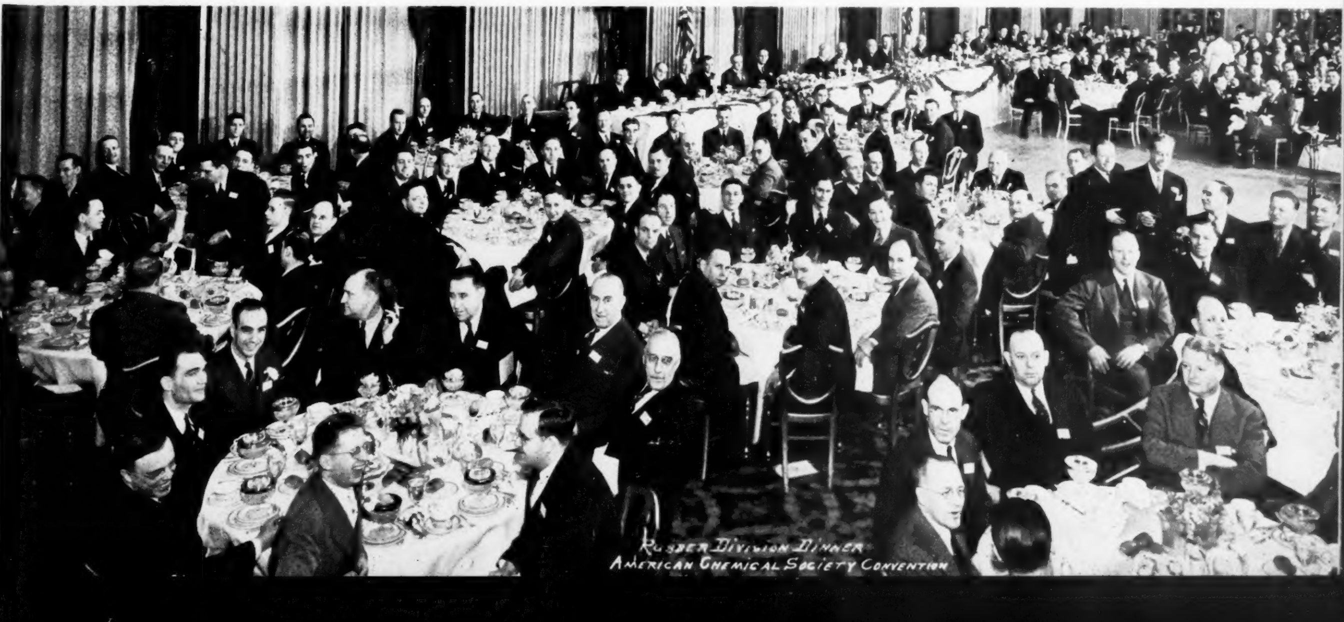
The entertainment following the dinner was made possible through the generosity of the following manufacturers and sales organizations:

American Cyanamid & Chemical Corp., American Zinc Sales Co., A. Schulman, Inc., Binney & Smith Co., C. K. Williams Co.—George S. Mepham, Columbia Chemical Division of Pittsburgh Plate Glass Co., Continental Carbon Co.—Wishnick Tumpeer, Inc., Cupples Co., Rubber Chemicals Division of E. I. du Pont de Nemours & Company, Inc., Farrel-Birmingham Co., Inc.—Andrew Hale, General Atlas Carbon Co., Godfrey L. Cabot, Inc., C. P. Hall Co., Herron & Meyer, H. Muehlstein Co., Inc., J. M. Huber, Inc., Midwest Rubber Reclaiming Co., Rubber Service Dept. of Monsanto Chemical Co., Moore & Munger, Naugatuck Chemical—Dispersions Process, Inc., Philadelphia Rubber Works Co., Pequanoc Rubber Co., New Jersey Zinc Sales Co., Inc., R. T. Vanderbilt Co., St. Joseph Lead Co., Titanium Pigment Corp., United Carbon Company, Inc.—F. F. Myers, U. S. Rubber Reclaiming Co., Inc., Xylos Rubber Co.

R. T. Vanderbilt Sponsors Los Angeles Meeting

THE April 1 meeting of the Los Angeles Group, Rubber Division, A. C. S., was held at the Hotel Mayfair, Los Angeles, Calif., under the sponsorship of the R. T. Vanderbilt Co., with 89 members and guests present. The speaker for the affair, E. B. Curtis, of Vanderbilt, presented "The Story of the Vanderbilt Company", describing the origin and development of this well-known rubber chemical firm. Arch Bailey, field representative of the Automobile Manufacturer's Association, presented a sound picture entitled "Singing Wheels."

Fred Woerner (C. P. Hall) won the



Rubber Division Dinner
American Chemical Society Convention

special prize, a portable radio; the door prizes, merchandise orders, went to J. DuGuid (Associated Rubber) and W. Haney (Kirkhill Rubber). All prizes were donated by the Vanderbilt company. The final meeting of the season is scheduled for May 6 at the Mayfair.

Petroleum Products Discussed Before Boston Group

NEARLY 200 members and guests of the Boston Group, Rubber Division, A. C. S., attended the mid-winter meeting at the University Club, Boston, Mass., March 28. The speaker, J. B. Tuttle, of the Standard Oil Co. of New Jersey, talked on "Petroleum Products in Rubber", describing the methods used in producing the various types of solvents, oils, and waxes; the requirements of rubber manufacturers that had been or were being met by petroleum refiners; and some of the problems faced and overcome. Dr. Tuttle went into considerable technical detail and answered a number of questions at the conclusion of his address.

The program for the evening was opened with the showing of the Thaw-Asia color film, "Persia Faces Today", through the courtesy of the Colonial Beacon Oil Co., and closed with an interesting demonstration of the art of magic by Bertram Adams, a master of his craft.

New York Group Outing Scheduled for June 6

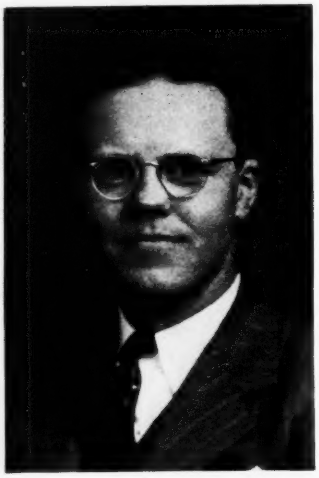
THE annual outing of the New York Group, Rubber Division, A. C. S., will be held at the North Jersey Country Club, Preakness, N. J., (about four miles from Paterson on the road to Pompton, officially known as the Hamburg-Pompton Turnpike) on Friday afternoon and evening, June 6. The excellent 18-hole golf course will be open all day. The many facilities of this country club are such as to insure sports events for all who wish to participate. Indoor activities are also available. K. J. Soule, chairman of the Group, has named S. C. Stillwagon as outing chairman. Further details will be given in the notices to be mailed to Group members.

The group's fall essay contest for members under 35 years of age will close September 4. Copies of the rules may be obtained from the secretary, B. B. Wilson, INDIA RUBBER WORLD, 420 Lexington Ave., New York, N. Y.

Cooper and Stevens Head Akron Rubber Group

L. V. COOPER (Firestone) was elected chairman of the Akron Group, Rubber Division, A. C. S., at a meeting on March 21 at the Akron City Club, Akron, O. Also elected were T. L. Stevens (C. P. Hall), who will serve as vice chairman, and D. G. Benson (Goodrich), secretary-treasurer. After dinner at the meeting, attended by 225 members and guests, a technicolor film, "The Power behind the Nation", was shown by the Norfolk & Western Railroad Co. The Underwriters Barber Shop Quartet furnished entertainment for the affair.

L. V. Cooper



T. L. Stevens

D. G. Benson

Adhesives Symposium at Detroit, May 9

THE Detroit Rubber & Plastics Group at its meeting May 9 at the Hotel Whittier, Detroit, Mich., will feature a symposium on adhesives (rubber, reclaim, asphalt, and latex). The speakers will be R. L. Wheeler, Chrysler Corp., Sam Adinoff, St. Clair Rubber Co., and J. S. Goodman, Collord, Inc. The discussion will be led by the following: R. J. Shroyer, Fisher Body, E. J. Fickers, Baldwin Rubber Co., and J. D. Morron, United States Rubber Co. The motion picture, "Diesel—The Modern Power", will be shown through the courtesy of General Motors Corp. The group, now in its fourth year, has an active membership of 250 and meets quarterly.

Chicago Group to Meet May 2 and June 6

SYNTHETIC rubber will feature the program of the Chicago Group, Rubber Division, A. C. S., to be held on May 2: "The Development of Properties of Hycar Synthetic Rubber", W. L. Semon (Hydrocarbon Chemical & Rubber) and "The Latest Developments in Neoprene", O. M. Hayden (Du Pont). A display of rubber products manufactured in the Chicago area and "Rubber Magic" by Walter Grote (United Carbon) are also on the program. At the June 6 meeting of the Group an exhibit of materials used by the rubber technologist is planned.

Rubber & Plastics Sub-Division, A. S. M. E., Meetings

RUBBER & Plastics Sub-Division, Process Industries Division, The American Society of Mechanical Engineers, 29 W. 39th St., New York, N. Y., through its chairman, F. L. Yerzley, physicist, Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has announced the personnel of the executive committee chosen at the last annual meeting: Dr. Yerzley; vice chairman, J. F. D. Smith, Research Division, United Shoe Machinery Corp., Beverly, Mass.; secretary, G. M. Kline, chief, Plastics Section, National Bureau of Standards, Washington, D. C.; L. E. Jermy, editor, *Machine Design*, Cleveland, O.; W. F. Bartoe, physicist, Rohm & Haas Co., Bristol, Pa.; S. H. Hahn, B. F. Goodrich Co., Akron, O.; R. A. North, chief engineer, Farrel-Birmingham Co., Inc., Ansonia, Conn.; W. A. Zinzow, physicist, Bakelite Corp., Bloomfield, N. J.

The Sub-Division is preparing for participation in the fall meeting of the A. S. M. E. in Louisville, Ky., October 13 to 15 and in the annual meeting of the Society and the Sub-Division to be held in December in New York. A regular meeting of the Sub-Division is not scheduled for the Louisville meeting, but two papers on plastics and rubber are planned. One has been definitely sched-

uled, and any member interested is requested to supply the other. Besides four papers are planned for the annual meeting, and suggestions relative to the Sub-Division's program are welcome.

Communications regarding papers should be addressed to Dr. Smith, who is in charge of the technical programs. He should know of intentions to present papers at least four months prior to the scheduled meeting in order to make proper arrangements with the author, and papers should be submitted to Dr. Smith three months prior to the meeting.

Ontario Rubber Section Elects Dr. Grace Chairman

NORMAN GRACE, of the Dunlop Tire & Rubber Co., was elected chairman of the Ontario Rubber Section, Canadian Chemical Association, at a meeting held at McMaster University, Hamilton, Ont., March 27. Others elected for the 1940-41 season were: secretary-treasurer, Thomas Batty, Firestone Tire & Rubber Co.; program committee, J. Ramsay, Gutta Percha & Rubber Co., R. M. Ferguson, St. Lawrence Chemical Co., and J. C. Howard, Kaufman Rubber Co. The speaker, M. J. C. Lazier, of the University of Toronto, spoke on "Why Airplanes Are Like That", discussing both lighter and heavier than aircraft. The section was scheduled to hold a joint meeting with the Buffalo Group, Rubber Division, A. C. S., on May 1, at the Hotel General Brock, Niagara Falls, Ont., with A. M. Neal, E. I. du Pont de Nemours & Co., Inc., speaking on "The Plasticization of Rubber."

Du Pont Ingredients for Latex

THREE recent developments by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., have been directed toward modifying Du Pont materials so as to make them more adaptable for latex compounding. The latex accelerator, Zenite Special, is a pure zinc salt of 2-mercaptobenzothiazole and differs from standard Zenite, supplied for a number of years, in that the standard type contains a small added amount of inert hydrocarbon which assists in dispersing it in dry rubber. However standard Zenite, unlike Zenite Special, does not disperse in water readily because of the added wax content.

Copper Inhibitor X-872 is pure disalicylal-ethylene-diamine, also an ingredient in Copper Inhibitor X-872-A. Here again, the pure material disperses in water better than does the diluted X-872-A, which is recommended only for dry rubber.

Aquarex WA Paste is essentially the same as the wetting and dispersing agent Aquarex D (sodium salts of sulphate mono-esters of a mixture of higher fatty alcohols), but, as the name indicates, it is supplied in a water-paste condition with a relatively low concentration of active ingredient.

Research Conferences at Gibson Island

EIGHT research conferences, sponsored by the American Association for the Advancement of Science, will be held this summer at Gibson Island, Md. The registration fee is \$3 per week with checks payable to Section C, A. A. A. S.; while rooms are \$2 per day. Registration fees and requests for room reservations or other information should be addressed to the director of the conferences, Neil E. Gordon, Central College, Fayette, Mo.

The program for the conference on "Organic High-Molecular-Weight Compounds", which is under the chairmanship of S. S. Kistler and is to be held from July 7 through July 11, follows: July 7, "Fundamental Problems in the Chemistry, Economy, and Processing of Rubber-Like Elastomers", E. A. Hauser, and "Crystallinity and Molecular Organization in Linear Polymers", C. S. Fuller; July 8, "The Preparation and Properties of Synthetic Rubbers", L. A. Wood, and "Properties and Vulcanization of Elastomers", J. T. Blake; July 9, "The Polymers and Copolymers of Butadiene", L. B. Sebrell, and "The Elastic Properties of Fibers as Related to Their Chemical Structures", Milton Harris; July 10, "A Contribution to the Structure of Inorganic High Polymers: a Correlation of the Structure and Colloid Chemical Properties of Clay Minerals", D. Le Beau, and "The Melamine-Formaldehyde Reaction", R. C. Swain; July 11, "The Structure of Copolymers of the Vinyl Type", C. S. Marvel.

At the conference on petroleum chemistry, Gustav Egloff will present two papers on June 17 on "Preparation of Olefins. Thermal Methods" and "Preparation of Olefins. Catalytic Methods"; on June 18, P. K. Frolich will present a paper on "Reactions of Olefins." Three of the papers scheduled for the conference on "X-Ray and Electron Diffraction" are: July 28, "Theory and Practice of Particle Size Determination", B. E. Warren; July 29, "X-Ray Studies of Linear Polymers of Known Chemical Constitution", C. S. Fuller; August 1, "Applications of the Electron Microscope", E. F. Burton. On July 16, in connection with the conference on textile fibers, H. Mark will present a paper entitled, "The Mechanical Properties of Textile Fibers." Other conferences not indicated above will deal with: catalysis, vitamins, corrosion, and photosynthesis.

Rubber and Plastics Group Formed in Montreal

THE initial meeting of the new Montreal Rubber & Plastics Group was held on March 28 in the chemistry building of McGill University, Montreal, P.Q., Canada, with 75 in attendance. The purpose set forth by the Group is to bring together all those in the district who are interested in the technology of rubber and plastics, and to further the knowledge of the members by presenting lectures by experts in these industries. At the meeting a provisional slate of officers was elected as follows: chairman, M. F. Anderson (Dominion Rubber); vice chairman, J. H. McCready (Hale Bros.); secretary-treasurer, R. V. V. Nichols (McGill U.); program and membership committee, R. P. Bales (Dominion Rubber), F. A. Todds (Northern Electric), A. B. Lewis (British Rubber), and P. Gunter (Mack Moulding).

The last meeting for the season was scheduled to be held at McGill on April 25, with W. H. MacHale, of the Plastics Division of American Cyanamid Co., as the speaker, and a sound film sponsored by *Modern Plastics*.

Rubber-Glo Mold Lubricant

RUBBER-GLO, distributed by C. P. Hall Co., Akron, O., is a general-purpose mold lubricant, said to impart a satin-like non-tacky surface to rubber products. When used as a lubricant for hose mandrels, it does not cause corrosion or pitting of the mandrels, and with white and light colored products Rubber-Glo affords protection against dirt until the article is packaged, it is claimed.

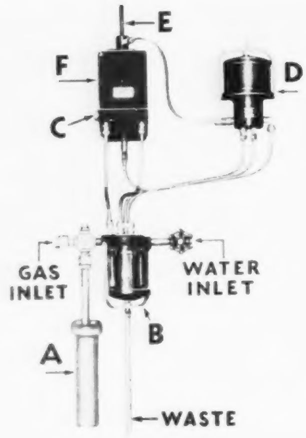
Test on Oil Hose For 10-Year Period

A DECADE ago, The B. F. Goodrich Co., Akron, O., made three lengths of oil suction and discharge hose with built-in nipples. After burst tests and prolonged leakage tests, the samples were filled with kerosene, placed on the roof, and connected to the factory air-line of about 100 pounds per square inch pressure which would vary to subject the hose to fluctuating pressures. After 10 years' exposure the samples were submitted to pressure tests with the following results; (1) kept at 150 pounds for 10 minutes, 250 pounds for 10 minutes, 400 pounds for three minutes, pressure increased until hose burst at 470 pounds; (2) 150 pounds for 10 minutes, 250 pounds for 10 minutes, hose burst at 400 pounds; (3) 150 pounds for 10 minutes, 250 pounds for 10 minutes, hose burst at 420 pounds. In each case the hose burst near the middle of the section. Improvements since these samples were made include a synthetic coating to prevent penetration of the carcass and rusting of the wire.

Witcarb—White Reenforcer

SAID to be of value in rubber compounds requiring high tensile, modulus, and tear resistance, Witcarb is a new white reenforcing filler, announced by Wishnick-Tumpeer, Inc., 295 Madison Ave., New York, N. Y. Witcarb is a finely divided, untreated, technically pure, precipitated calcium carbonate with a specific gravity of 2.68, a particle size of two to three microns, a pH value of 9.0, and a residue (325 mesh) of 0.114%.

New Machines and Appliances



Analysis Unit of Cambridge Oxygen Recorder

Automatic Oxygen Recorder

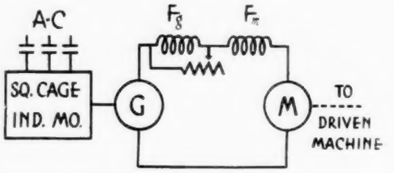
THE Cambridge oxygen recorder, operating from an electric supply line, provides a continuous indication and graphic record of the amount of oxygen in any gas. In chemical plants or similar processing industries where gases may combine to form explosive mixtures, the continuous indication of oxygen concentration enables proper control to eliminate hazard; while in power plants the determination of combustion efficiency by measuring excess oxygen in the flue gas provides a more fundamental method than that of CO_2 indication, according to the instrument manufacturer.

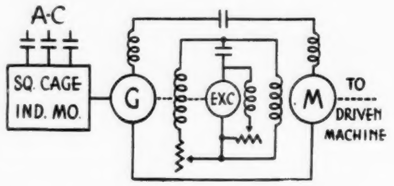
In operation, the bubbler-aspirator *B* provides suction to draw about one liter of gas per minute through the inlet with the condensate falling into the drip pot *A*, the bubbling action serving to scrub the sample. The incoming gas divides into two streams, the larger of which flows directly to the aspirator and acts solely as a line purge. The remaining gas flows through a secondary filter and orifice *C* and thence to an inner bubbling tube in the aspirator. Pressure drop across the orifice as well as the flow is constant. The gas sample is collected by an inner bell in the bubbler, and from there it passes to one side of the analyzing cell *D*, then flows through tube *E* in the furnace, back through the other side of the analyzing cell, and then to the bubbler aspirator where it goes to waste in the main gas stream. The center of tube *E* of the furnace contains a carbon rod heated so that any oxygen in the base is converted to CO_2. Thus one side of the cell *D* is exposed to the original gas containing oxygen; while the other side is exposed to the same gas, with the exception that the O_2 has been converted to CO_2. The meter unit is arranged to measure the difference in thermal conductivity between the two gases, a value which is directly proportional to the oxygen concentration of the original gas. Cambridge Instrument Co., Inc., 3732 Grand Central Terminal, New York, N. Y.

Adjustable-Speed A.C. Drive

A NEW ten-to-one adjustable speed drive, which uses a series circuit without the usual exciter, is designed especially for industrial applications requiring smoothly adjustable speeds over wide ranges with constant torque, in locations where only alternating current supply is available. Among the many applications cited are the following: materials handling conveyers, gear cutting machines, small slitters and rewinders, coal feeders and stokers, and extruders. The drive is built in ratings from one to 15 h.p. with a standard speed range of from 175 to 1,750 r.p.m., for two- or three-phase operation on 220-, 440-, 550-volt, 60-cycle systems.

Including the control, the new drive has five parts: (1) a single-unit motor-generator set, consisting of a squirrel cage induction motor which drives a series D.C. generator; (2) a D.C. series motor, coupled to the driven load; (3) a rheostat which is in parallel with the generator series field and which controls the driving motor speed; (4) an across-the-line starter for the squirrel-cage motor; and (5) a pushbutton station. The new drive is said to be more flexible than the wound-rotor motor type and to be more efficient than the con-





***(Top)* Circuit of New Adjustable-Speed Drive**

Generator, driving motor, and their fields are in series. When rheostat has maximum resistance, current through generator field, Fg, is maximum. Thus generator voltage is maximum, and motor, M, runs at maximum speed. As rheostat resistance is decreased, Fg is weakened, generator voltage drops, and speed of motor decreases proportionally.

***(Bottom)* Circuit of Conventional Drive**

More control apparatus and an exciter with its attendant losses in energy are requirements of this system.

ventional variable-voltage system because there are no exciter rotational losses. Also the high-torque characteristics of the D.C. series motor are combined with the flat-speed properties of the shunt motor to give good speed-torque characteristics.

Optional features include inching and dynamic braking. The latter requires no external braking resistor, but employs a braking field wound right into the motor. Westinghouse Electric & Mfg. Co.

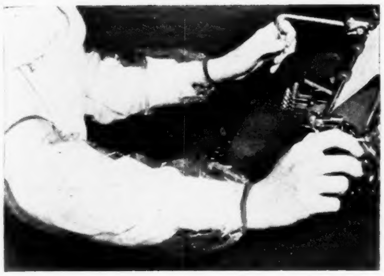
Saunders Patent Valve

Motor-Operated Valve

THE Hills-McCanna Saunders patent valve is adaptable for use in the automatic flow control of corrosive liquids, gases, and liquids containing suspended solids. In the rubber industry the valve finds use in the handling of latex solutions, for air and water lines, and, in synthetic manufacture, for handling salt and acid solutions and synthetic latices.

The valve is motivated by a Barber-Colman electrical operator, located above the valve. In the valve proper, the operating mechanism is separated from the liquid by the diaphragm which serves as the opening and closing medium. The valve body is of alloy metal or cast iron, unlined or lined with hard or soft rubber or synthetic rubber. Diaphragms are made of various rubber compositions, neoprene, "Thiokol", Koroseal, or PVA. Once installed, the only service said to be necessary is the occasional replacement of the diaphragm, which does not require removal of the valve from the line. Barber-Colman Co.

New Goods and Specialties



These Sleeve Protectors, of Goodyear's Pliofilm, Are Transparent, Non-Inflammable, Waterproof, Resistant to Mild Acid Solutions, and Unaffected by Oil or Grease. Protex Products Co.

Round Belting Features Steel Spring Core

ROUND-TEX belting is made by covering a steel spring base with rubber tire-tread stock. Over this is placed a layer of durable braid which acts as a shock absorber for the spring. An outer covering of rubber affords friction and also protection for the braid. In fastening the belt, extended ends of the steel spring are threaded into each other over a rawhide plug. Sudbury Laboratory.

First All-Rubber Multiple Outlet Plug Introduced by U. S. Rubber

AN UNBREAKABLE all-rubber multiple-outlet plug (cube tap)—said to be the first in electrical history—has been approved by Underwriters' Laboratories. Claimed to have unusual safety qualities, the new plug is capable of withstanding heavy pressure, and metal parts cannot become exposed under any conditions. It is smaller than other types, and the rubber makes it

U. S. All-Rubber Plug

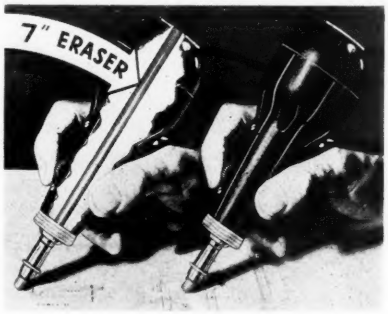
scratch- and sound-proof. The plug is molded in a single unit, after which the metal parts are inserted and anchored by a patented process. United States Rubber Co., 1230 Sixth Ave., New York, N. Y.

Versatile Rubber-Cushioned Seat

THE Duo sport seat consists of two circular sponge rubber cushions, covered with imitation leather on one side and soft corduroy on the reverse side. The two pads are held together with a Talon zipper. The Duo seat can

Duo Sport Seat

be used as one cushion, or when opened about three-quarters, it may be used as a seat and back rest. When completely taken apart it serves as two separate seats. The Perfect Rubber Seat Cushion Co.



Bruning Erasing Machine

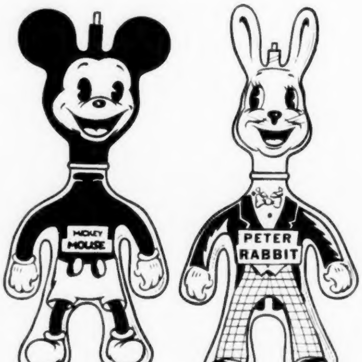
Construction of Round-Tex Belting

Erasing Machine Uses Seven-Inch Rubber Core

IN ORDER to overcome the frequent changing of short eraser tips, the Bruning hollow shaft erasing machine uses an eraser seven inches long. This rubber core, which fits into the tubular armature shaft of the motor, can be fed out as required. The motor operation is controlled by a sliding button that fits under the index finger. Charles Bruning Co.

Roller Skate Brake of Molded Rubber

A MOLDED rubber block, attached to the toe of a roller skate shoe by cement and clinch nails, acts as an effective brake, when brought in contact with the rink floor by tipping the shoe forward. There is an extra thickness of rubber at the point of wear, and deeply countersunk washers eliminate the danger of marring the floor by protruding nails. Blair Rubber Products.



These Squeeze-Me Dolls of Heavy Latex Rubber Are Not Balloons, But Are Inflated Only Enough to Round Them to Shape. Squeezing Produces a Squealing, Squawking Noise. Oak Rubber Co.

This Ipco Non-Skid White Overshoe, Featuring a Suction-Squeegee Sole, Is Designed for Workers in Industrial Plants, Dairies, Creameries, Packing Houses, Etc. Industrial Products Co.

Blair's Roller Skate Brakes

UNITED STATES

Strikes Cut Output

Serious labor trouble in major industries adversely affected industrial activity last month, and further inroads are threatened unless effective solutions to this difficulty are forthcoming. Thus declines were registered in carloadings and steel, power, paper, and automobile production; while fluctuations occurred in paperboard, lumber, and oil output. Minor gains, however, were reported for cotton mills and rayon weaving.

National industrial activity seems to be leveling off after an almost steady advance since last spring. An outstanding problem is additional plants and equipment and, of course, raw materials, on some of which priorities exist. A Government agency has estimated that a 60% rise in defense efforts is essential to meet our defense program.

Orders for heavy electrical equipment in February broke all former records; while building contracts in March, the greatest for the month, were the third highest monthly aggregate ever reported. Plate glass output for the first quarter was 19% higher than for the same period in 1940 and also higher than the record years, 1936 and 1937, and it is believed that 1941 will be a banner year. Carloadings for the second quarter of 1941 are expected to be 14.9% greater than in the corresponding period of 1940; and prospects for the second quarter for shoe production are considered favorable, with first quarter output at the best spring run since 1937. Cotton mills are operating at the highest daily rates on record, and the near-term outlook continues good. A recent survey reveals that U. S. machine tool production for 1941 will total $650,000,000, and the 1942 figure is expected to be at least as great.

Automobile production was curtailed in April because of a major strike, and another one seems imminent. Retail sales are reported "abnormally high", and dealers' stocks thus are being reduced. One rumor is that to meet rising costs, manufacturers are contemplating presenting smaller models and substituting plastics for strategic metals where possible. Then one concern, which produces about 50% of the country's automobiles, announced that in behalf of national defense it would not change passenger-car models for 1943, but would continue for another year the 1942 styles, which are being designed with an eye to saving important materials. Other companies are believed favorably considering prolonging 1942 models. In another move to divert men, money, machines, and materials to defense needs, the automobile industry last month was said to have agreed to cut output by 20%, or about one million cars and trucks, effective August 1. Such a policy, incidentally would release a considerable amount of rubber for defense.

The rubber manufacturing industry as a whole has been operating close to capacity, and further increases seem improbable unless additional facilities become available. Leaders at the exceptionally high levels during the first quarter were tires, mechanicals, and insulated wire, and prospects for the second quarter are believed as great. The value of manufacturers' inventories of rubber products has been rising steadily, but the value of shipments, though up slightly recently, has not yet reached the high point of the last quarter of 1940.

New Budwood to Haiti

The United States Department of Agriculture, Washington, D. C., has received a report from R. J. Seibert that the largest consignment to date of budwood of superior rubber trees developed in Malaya and Netherland India arrived safely in Haiti, after shipment from the Philippines where the stock has been propagated since 1934.

Mr. Seibert, a member of the last party to return of the four expeditions sent by the Department to survey rubber planting prospects in the Americas, remained in Haiti to complete arrangements for cooperative research and to handle this shipment, which the Department regards as a most important contribution to the rubber programs for the Americas. The budwood is to be propagated on seedlings planted recently in Haiti to form the second of the large budwood increase gardens, established as research and propagation centers in the cooperative effort to reestablish Western Hemisphere sources of rubber. The other garden is at Tela, Honduras.

From these gardens, explains Dr. E. W. Brandes, in charge of the program for the Bureau of Plant Industry, the high-yielding planting stock will be distributed to Government nurseries. There is now at least one in each of the ten cooperating countries. In these nurseries the material will be increased again and will then be redistributed to commercial plantations where it will be grown for still further increase and for immediate use on the seedling trees of the plantations now being developed and in prospect.

The existence of the Philippine supply of selected clones of high-yielding and disease-resistant rubber trees is regarded as a highly favorable factor in the rubber program. This rubber stock is not now available from East Indian and Malayan plantations, for planting stock is now under an export embargo.

All but three of the rubber survey explorers have returned to Washington—Mr. Seibert; Dr. T. D. Mallery, conducting cooperative plantings with the Government of Brazil at Belem; and Dr. Karl D. Butler, who left April 3 on an expedition into the Matto Grosso region of Brazil in the vicinity of the Bolivian border.

CALENDAR

May 1.	Buffalo Rubber Group and Ontario Rubber Section. Joint Meeting. General Brock Hotel, Niagara Falls, Ont., Canada.
May 1-3.	American Physical Society. Washington, D. C.
May 2.	Chicago Rubber Group.
May 6.	Los Angeles Rubber Group. Mayfair Hotel.
May 6-8.	Midwest Safety Conference. Sherman Hotel, Chicago.
May 9.	Detroit Rubber & Plastics Group. Hotel Whittier.
May 19-21.	American Institute of Chemical Engineers. Edgewater Beach Hotel, Chicago.
May 21-22.	American Management Association's Production Division. Hotel Astor, New York, N. Y.
May 22-23.	Association of American Battery Manufacturers, Inc. Spring Meeting. Hotel Statler, Detroit.
May 26-29.	National Association of Purchasing Agents. 26th Annual International Convention and 'Inform-a-Show. Stevens Hotel, Chicago.
June 1-6.	SAE. Summer Meeting. The Greenbrier, White Sulphur Springs, W. Va.
June 6.	Chicago Rubber Group.
June 6.	New York Rubber Group. Annual Outing. North Jersey Country Club, Preakness, N. J.
June 16-20.	A.S.M.E. Semi-Annual Meeting. Kansas City, Mo.
June 19-21.	Wilbur D. Bancroft Colloid Symposium. Cornell University, Ithaca, N. Y.
June 23-27.	A.S.T.M. Annual Meeting, Palmer House, Chicago.

Certificate of Necessity Issued

Office of Government Reports, Washington, D. C., (in collaboration with the National Defense Advisory Commission) included in recent listings of Certificates of Necessity for private plant expansion the following: American Zinc Co. of Illinois, St. Louis, Mo., for slab zinc (spelter) at an approximate cost of $1,185,000; Dow Chemical Co., Midland, Mich., for acrylonitrile, magnesium metal, "Thiokol", and butadiene, $12,249,000; Goodyear Aircraft Corp., Akron, O., non-rigid airships, $64,000, airplane wheels and brakes, $420,000, and airplane surface parts, $404,000; Goodyear Tire & Rubber Co., Akron, gas masks and synthetic rubber, $260,000, and airship rubberized fabric, $15,000; New Jersey Zinc Co., New York, N. Y., washed oxide of zinc, $101,000, and slab zinc, $1,258,000.

Certificates enable manufacturers to avail themselves of the 60-month tax amortization of plant cost, but the Federal Government provides no part of the sums listed. Certification does not mean that such expansion necessarily will take place.

EASTERN AND SOUTHERN

U. S. Rubber Sets Up Defense Exhibit

A comprehensive exhibit of rubber products for defense has been set up by the United States Rubber Co. at its building at 1230 Sixth Ave., New York, N. Y. To be used for educating U. S. Rubber employes in defense requirements, the exhibit is also intended to serve as an aid to government representatives and industrial purchasers of rubber goods for defense use. It is expected that similar exhibits will be opened in Washington and Los Angeles.

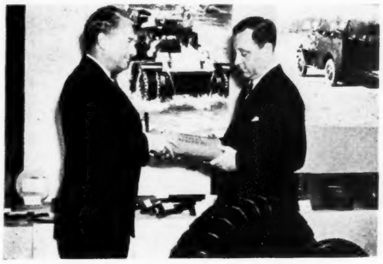
Among the products on display are: an officer's uniform, aviators' suits, an aviator's helmet, all utilizing "Lastex"; raincoats; gas mask carrier; sponge rubber tank lining with Naugahyde cover; protective latex foam pads for chest, knees, etc.; sponge rubber gunner's eye piece; rubber tank tread blocks; synthetic sponge matting; rubber cleats for destroyer decks and gun platform mountings; forming pad for metal stampings; new cellular rubber sheeting (hard and soft rubber) for life preservers and as heat insulation; rubber-lined pipes; bullet-sealing fuel hose with a sealing compound between a synthetic lining and cover; other hose such as airplane refueling, air duct, linen fire, twin extinguisher, hydraulic landing gear, air gun, non-kinking gas mask, and pneumatic tool; electrically conductive V-belt; Rai-seal joint for airplane fields; synthetic impregnated asbestos sheet; representative tires and tubes; wire and cables for power, light, and communications; shoes with conductive rubber soles and heels; aviators' boots with Sperry non-skid soles; officers' boots; over-the-shoe boots; parachute jumpers' shoe with sponge rubber insoles; bullet-sealing gas tank; various rubber mountings; Ekko molds for rubber and plastics production; airplane seat with rubber in tension; Naugahyde simulated leather; various fabrics to resist fire, poison gas, water, and moths; rubber lining for casting concrete; military cap cover; wash basin of rubberized fabric; flexible container for field electrical equipment; gloves; life preservers; divers' suit; and a heat-insulated life-saving suit.

U. S. Royal Foam Now Koyalon

U. S. Rubber has changed the name of its U. S. Royal Foam to Koyalon to avoid the restrictions of a descriptive title and to cover the increasingly diversified uses to which this foam rubber is being put. A greatly expanded advertising and consumer education program is being developed this spring and summer, featuring, in addition to its uses in mattresses, the adaptability of Koyalon to upholstery in automobiles, restaurants, railroads, airlines, and home furniture.

Sponsors Safety Organization

U. S. Rubber, to promote safety on the highways through more careful truck driving, is sponsoring the newly created Star Drivers Club, which will award insignia, a safety award certificate, and a membership card to drivers credited with at least 300,000 miles of operation without accidents for inter-city drivers and 100,000 miles within the city or suburbs. For each additional 100,000 miles without an accident another star will be added to the Safe Drivers Club pin. Highest award will be a diamond pin given for 600,000 non-accident miles in inter-city driving and 250,000 miles in city travel. The safety award certificate will carry the signature of F. B. Davis, Jr., president of U. S. Rubber, and of Harold J. Jones, chairman of the safety committee of the American Trucking Association.



Vice Presidents Herbert E. Smith and L. D. Tompkins, Members of U. S. Rubber's Defense Committee, Inspect Portable Airplane Fuel Hose at Firm's Defense Exhibit

Providence Building Sold

Documents have been filed with the Recorder of Deeds, Providence, R. I., showing that U. S. Rubber sold to a "nationally known wholesale drug and chemicals concern" its building at 40 Sprague St. The name of the purchaser was not revealed.

Novel Safety Educational Program

Naugatuck Chemical Division of U. S. Rubber, Naugatuck, Conn., because of the incidence of accidents during 1939 attributable to lack of precaution, carelessness, and poor judgment by the operators, decided upon a more impressive means of safety education that would reach each employe without depending upon his visual receptivity. Consequently early in January, 1940, a public address system was purchased and installed. The expense was defrayed in part with prize money received in the United States Rubber Co. Safety Contest in 1938.

The microphone and amplifiers are located in the office building; while the loud speakers are placed at three strategic ponts in the plant. At first broadcasts were given almost daily when the men were washing to leave the plant or at the time when shifts were changing, but at present programs are conducted two or three times weekly and also on special occasions. Programs consist of recorded music, plant announcements, current events, news, and talks on safety problems.

During February an extra-special program was arranged in conjunction with safety shoe month. A loud speaker was installed over the bulletin board at the gatehouse, and below the speaker appeared a lifesize representation of a workman complete in work clothes and painted in natural colors. Surrounding this display were pertinent data relating to foot injuries. During shift changes broadcasts occurred in which workers were called by name, thus getting the personal touch in reminding them of the safety shoe program.

Spencer Speaks

H. B. Spencer, assistant director of industrial and public relations at U. S. Rubber, was the main speaker at a recent dinner meeting of the Foreman's Club of Allegheny Valley at New Kensington, Pa. His theme was the present need of improved employer-employe relations, stressing industry's gigantic task in the national defense program.

Metal Hose Reorganizes

Metal Hose & Tubing Co., Inc., Brooklyn, N. Y., has reorganized under the name Metal Hose & Tubing Co. (Delaware) and by May 1 will have moved its general offices and factory to a modern two-story building with over 110,000 square feet of floor space in Dover, N. J. The original firm was organized in 1912 by John M. Oden to manufacture gasoline and oil hose and since his death, February 22, 1938, has been run for his estate by veteran employes, who purchased the business March 1 and effected the reorganization.

The new company will be headed by an executive committee consisting of Vice President A. L. Wallace, Treasurer W. D. Magagnos, and Sales Manager J. S. Thompson. Mr. Wallace joined the firm in 1924 as chief engineer, was made works manager in 1930, and upon Mr. Oden's death became vice president and general manager. Mr. Magagnos entered the accounting department in 1916, was later appointed head of the department, and in 1933 was named treasurer and a director. Mr. Thompson, who joined the sales department in 1925, was assistant sales manager since 1928.

The branches at St. Louis, Mo., and Dallas, Tex., will be continued, and a new office will be opened at 42-51 Hunter St., Long Island City, N. Y.

Foster D. Snell, Inc., chemical consulting concern, 305 Washington St., Brooklyn, N. Y., held its annual dinner March 27 at The Brooklyn Club attended by 25 of the staff. Edward Heeb has joined the company.

Crescent Insulated Wire & Cable Co., Trenton, N. J., is operating with three shifts and additional help. Company officials report a scarcity of copper is delaying some production.

Supply Contracts Awarded

In recent listings of supply contracts awarded by various departments of the United States Government appeared the following:

NAVY: *bags, water,* United States Rubber Co., $1,238; *batteries, storage, and parts,* Electric Storage Battery Co., $279,994; *brushes, paint,* Pittsburgh Plate Glass Co., $21,408; Rubberset Co., $24,028; *bunting, wool,* Wellington Sears Co., $61,901.35; *cable,* Anaconda Wire & Cable Co., $803,459, Boston Insulated Wire & Cable Co., $61,823, Collyer Insulated Wire Co., $169,853, General Cable Corp., $1,427,740, General Electric Co., $200,921.50, National Electric Products Corp., $719,716, Okonite Co., $496,896.80, Phelps Dodge Copper Products Corp., $2,803,766, Rockbestos Products Corp., $36,149, John A. Roebling's Sons Co., $4,666.55, U. S. Rubber, $73,173; *canvas,* Mt. Vernon Woodberry Mills, Inc., $33,670; *hose,* American Rubber Mfg. Co., $5,039, B. F. Goodrich Co., $208,869, Goodyear Tire & Rubber Co., $65,075, Hewitt Rubber Corp., $19,181, Lee Rubber & Tire Corp., $73,427, Manufactured Rubber Products Co., $695; *magnesia and products thereof,* Plant Rubber & Asbestos Works, $16,027; *matting,* Goodrich, $10,260, Boston Woven Hose & Rubber Co., $24,658; *packing,* Boston Woven Hose, $7,386, Quaker Rubber Corp., $51,311, Raybestos-Manhattan, Inc., $13,294; *rafts,* New York Rubber Corp., $41,496; *raincoats,* Marathon Rubber Products Co., $109,800; *separators for storage batteries,* Lyons Storage Battery Co., $12,154; *tape, insulating,* Accurate Mfg. Co., $13,978; *valves,* Jenkins Bros., $212,181; *zinc,* American Zinc Sales Co., $10,910; *zinc oxide,* American Zinc, $143,000.

WAR: *ammunition material,* Monroe Rubber & Packing Corp., $4,005; *balloons,* Air Cruisers, Inc., $1,200; *brake assemblies,* Goodyear, $113,173; *cable,* C. B. Garfield Electric Supply Co., $402, Roebling, $2,742; *cloth,* Wellington Sears, $420,980; *cords,* Belden Mfg. Co., $4,400; *cotton duck,* Mt. Vernon Woodberry, $64,550; *fuse bodies,* Boston Woven Hose, $30,805; *gages, tire,* Scovill Mfg. Co., $2,594; *gaskets,* Seiberling Rubber Co., $7,878; *gears,* United Shoe Machinery Corp., $2,203; *masks,* Ohio Chemical & Mfg. Co., $134,077; *oil,* Socony-Vacuum Oil Co., Inc., $1,409, Sun Oil Co., $1,885; *overshoes,* Hood Rubber Co., Inc., $1,250; *tape, adhesive,* American White Cross Laboratories, Inc., $10,950, Coated Products, Inc., $2,655.45; *testing machine,* Baldwin Locomotive Works, $10,210; *tires,* Firestone Tire & Rubber Co., $10,799, Pharis Tire & Rubber Co., $1,310; *tires and tubes,* Firestone, $80,268; *valves,* Industrial Rubber Co., $7,250, O'Sullivan Rubber Co., $74,000; *woolen suiting,* Mishawaka Rubber & Woolen Mfg. Co., $150,500.

Armstrong Cork Co., Lancaster, Pa., recently made the following appointments in its floor division: general sales manager, Kenneth O. Bates; assistant general sales manager, M. J. Warnock; and assistant sales manager, C. N. Painter.

Continental Carbon Co., 295 Madison Ave., New York, N. Y., recently added to its Sunray, Tex., plant two large cylindrical bulk storage tanks, and bulk storage capacity is now well over two million pounds of dustless carbon black. The tanks were specially constructed to handle both package and bulk form of the black and will insure prompt hopper car shipments to customers requiring bulk deliveries.

The Office of Production Management, Washington, D. C., through Priorities Director E. R. Stettinius, Jr., released a general preference order directing the exact allocation of nearly one million pounds of neoprene among about 250 industrial users during April and almost entirely for defense work. Although names of companies and amounts received were not revealed, it was said orders for Britain were included. A small quantity of neoprene was also set aside for its manufacturer, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., for laboratory and experimental purposes. Mandatory control was established for neoprene March 7, but the order mentioned provides for the first time actual allocation of the synthetic to consumers.

Intercontinental Rubber Co., 745 Fifth Ave., New York, N. Y., in its annual report to stockholders signed by the acting president, Henry G. Atwater, stated that during 1940 the production of guayule rubber in Mexico, materially increased by placing the company's three factories in continuous operation and by improving extraction methods, totaled 8,325,200 pounds, against 5,764,400 pounds in 1939. Present production is at a somewhat higher rate than the average of 1940 to meet demand from United States manufacturers. The plantations in Sumatra in 1940 shipped to this country 1,733,000 pounds of first-grade sheets, against 1,405,250 pounds in 1939. Production last year amounted to 1,832,080 pounds, contrasted with the 1939 figure of 1,378,000 pounds. The Intercontinental plantation comprises 4,717 acres of mature trees, 224 acres of immature trees, 446 acres occupied by buildings, roads, and swamp lands, and 6,598 acres of reserved area. At December 31, 1940, the mature area had 376,369 trees.

The Rubber Products Manufacturing Industry Committee at its meeting March 27 unanimously voted to recommend a 40¢ minimum wage for the rubber industry and filed the report with Philip B. Fleming, administrator of the Wage and Hour Division of the United States Department of Labor. If approved, after a public hearing, the recommendation will raise the hourly wage rates of 9,900 of the approximate 132,000 workers the industry employs. In its report the Committee requested "The Administrator to give sympathetic consideration to any application received from the industry for permission to employ learners at a reasonable rate lower" than 40¢ an hour and for "a reasonable period of time."

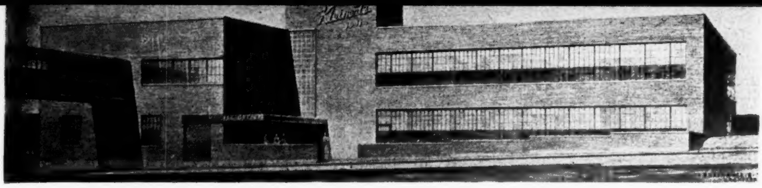
Export Control Extended

President Roosevelt and the State Department have placed under license export control many chemicals used in making synthetic rubber, plastics, and other synthetics needed for the national defense program. A recent list, covering primary chemical materials used in making buna and neoprene types of synthetics, includes butadiene, acrylonitrile, butylene (α-butylene, β-butylene, isobutylene), and chloroprene. Even longer is the list of materials subject to license which are used in manufacturing synthetic resins and plastics, including alkyd resins, formaldehyde, naphthalene, phenol, aniline, phthalic anhydride and its derivatives, vinylidene chloride, and styrene.

Also under license export control are the following synthetics: polymers and copolymers of butadiene, acrylonitrile, butylene, dibromoisolentane, chloroprene, styrene, vinylidene choride, and synthetic rubber-like compounds, fabricated or unfabricated.

Other products mentioned in recent listings of goods under license export control follow: antimony sulphide; asbestos and products thereof; balloons for military use; master batch (40% carbon black, 60% crude rubber); batteries and parts therefor; chlorinated rubber; chrome pigments containing 10% or more chromium including chromic oxide (chrome green), lead chromate (chrome yellow), and zinc chromate; deicers; liquid latex concentrated 60%; molding machines and presses and parts thereof; naphtha, solvents, and other light finished products (if not for paint use); parachute webbing, silk cord, canvas, rubber cushions, elastic, and tape; lithopone; titanium dioxide; rubber dust; rubber tires and inner tubes (effective April 15); solvents from petroleum; sulphur (to Cuba, license, elsewhere, no license); synthetic rubber; toluene; zinc (ore, metal oxide, and sulphide); dibutyl phthalate (n-butyl phthalate); diethyl phthalate (ethyl phthalate); hexamethylenamine; aniline oil and salts; sulphur chloride (suphur subchloride, sulphur monochloride, sulphur dichloride).

The Okonite Co. held its annual stockholders' meeting April 15 in Passaic, N. J., and The Okonite-Callender Cable Co., Inc., at Paterson, N. J., April 16, at which several executive changes were voted. Leland B. Duer who for several years participated in the work of the company's legal department, as a partner in a New York law firm, was elected a director of The Okonite Co., to succeed the late Geo. Murray Brooks, former executive vice president. Charles E. Brown, Jr., assistant to the president, was elected vice president of Okonite and Okonite-Callender Cable Co. Mr. Brown, with the company's sales department since 1925 will remain in charge of the Washington, D. C., office. Albert F. Metz, treasurer of both companies, was elected a director of Okonite-Callender. A director of The Okonite Co. for many years, Mr. Metz has been with its financial department since 1919.



Architect's Drawing of Kleinert's New Factory in College Point

I. B. Kleinert Rubber Co., 485 Fifth Ave., New York, N. Y., is erecting a new three-story ultra-modern factory building 200 by 150 by 75 feet to provide 60,000 square feet of manufacturing space, which will occupy an entire block on 20th Ave. between 128th and 129th Sts. in College Point, L. I. The upper floors will be connected to the present factory by a stainless steel bridge over 128th St. Increased demand for the company's products compelled the addition. The company manufactures corsets and girdles, play shoes, rubber bathing suits and accessories, Kleen-a-Pads, infants' items, dress shields, rubber-lined travel and beauty kits, shower curtains, and household accessories.

The Foremen's Club of U. S. Rubber Reclaiming Co., Inc., Buffalo, N. Y., held a meeting presided over by President E. E. Harvey, at the Lenox Hotel, Buffalo, on April 3 at which the speaker was W. G. Nelson, divisional manager of the product control division of the United States Rubber Co., at Detroit, Mich. Mr. Nelson, who discussed "The Technical Man in Industry," precisely related the functions of the research, control, manufacturing, and "good relations" departments and showed how these are all equally important. A 45-minute question period followed. Mr. Nelson's talk. Members of the Buffalo Group, Rubber Division, A. C. S., attended the affair as guests of the Foremen's Club.

The Thermoid Co., Trenton, N. J., has purchased 1.3 acres of land adjoining its factory, to be used for further expansion. The company is operating with three shifts. Thermoid and its domestic subsidiaries reported gross sales in March, the largest in the history of the company, totaled $943,592, 35% over the $695,647 volume for March, 1940. The last previous peak sales were in February, 1941, at $855,217. Cumulative gross sales for the first quarter this year amounted to $2,587,192, against $2,-039,827 for the 1940 period.

Atlas Powder Co., Wilmington, Del., has acquired the business and assets of The Keratol Co., Newark, N. J., manufacturer of artificial leather. This acquisition adds substantially to the facilities of the Zapon Division of Atlas Powder. The Keratol business will henceforth be conducted under the Zapon-Keratol Division of the Atlas Powder Co. All trade names will be retained, and the manufacture of Keratol products will be continued at the Newark plant, under the same management and personnel.

Frank T. Lahey, who was long connected with the rubber business and spent a number of years in Akron, O., died March 27 at his residence in Monroe, N. Y. He leaves his wife, a brother, and two sisters.

John Royle & Sons, machinery manufacturer, 10 Essex St., Paterson, N. J., recently elected the following officers. Clifford H. Ramsey, who purchased controlling interest in the firm after about a year as general manager, is the new president, succeeding Vernon E. Royle, who will, however, although no longer actively connected with the firm, remain a director. Mr. Ramsey's successor as treasurer is Thomas C. Malcom, formerly assistant treasurer. Justin H. Ramsey was reelected vice president; while Robert H. Kelley continues as secretary. The four officers and Mr. Royle comprise the directorate.

Jos. Stokes Rubber Co., Trenton, N. J., has appointed Lloyd R. Leaver vice president and general manager of its plant at Welland, Ont., Canada. Willard A. Patterson, formerly of the Pharis Tire & Rubber Co., Newark, O., has been added to the sales force of the Trenton plant.

Mercer Rubber Co., Hamilton Square, N. J., has appointed Fred H. Barth vice president. He was formerly in the sales department. William H. Sayden, Jr., president and treasurer, was on a business trip to Washington, D. C. An official of the company said:

"Specialties have become a growing factor in our business, aside from belting and hose, the principal production. Business continues very brisk, and it looks as if it would continue so for many months, but prices appear to be too close to costs. Cotton duck has greatly advanced in price."

Buna Production Started

The Standard Oil Co. of New Jersey, 26 Broadway, New York, N. Y., reports that production of Perbunan started during the second week of April at its new plant at Baton Rouge, La., with operations now at the full capacity of 10,000 pounds per day. At present only one grade is being produced, which contains approximately 25% acrylonitrile, has a specific gravity of 0.97, and is of the same nature as the German product imported to this country prior to the war. Stanco Distributors, Inc., also of 26 Broadway and a subsidiary of Standard Oil of New Jersey, will market the synthetic rubber which now sells at 85¢ per pound, f.o.b. plant. Although current demand for Perbunan is reported to be far in excess of output, efforts will be made toward a wide distribution among consumers. As yet no government priorities have been established for Perbunan.

Richmond Mica Corp., Richmond, Va., according to President J. Fuller Brown, has appointed the Standard Chemical Co., Akron, O., its exclusive sales agent for the rubber industry. The Richmond company, established in 1884, manufactures both water-ground and dry-ground micas, and its products are sold under the trade names "Silversheen", "Diamondsheen", and "Silversheen Special."

American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y., anticipating further substantial broadening of its activities in plastics, has changed the name of its Beetle Products Division to Plastics Division. The company, which pioneered urea-formaldehyde plastics under its trade mark Beetle, is one of the world's leading producers of resins of this type. C. J. Romieux is sales manager of the division in charge of commercial activities; while K. E. Ripper, as chief technologist, heads its technical activities.

Thiokol Corp., 780 N. Clinton Ave., Trenton, N. J., through President Bevis Longstreth has announced the following personnel changes: J. W. Crosby has been made sales manager; Harry R. Ferguson, manager of special products; and S. M. Martin, Jr., development manager.

Precision Roll & Rubber Co., Yardville, N. J., reports business as very good. Secretary Donald Frey succeeds Thomas D. Dantzler, resigned, as president.

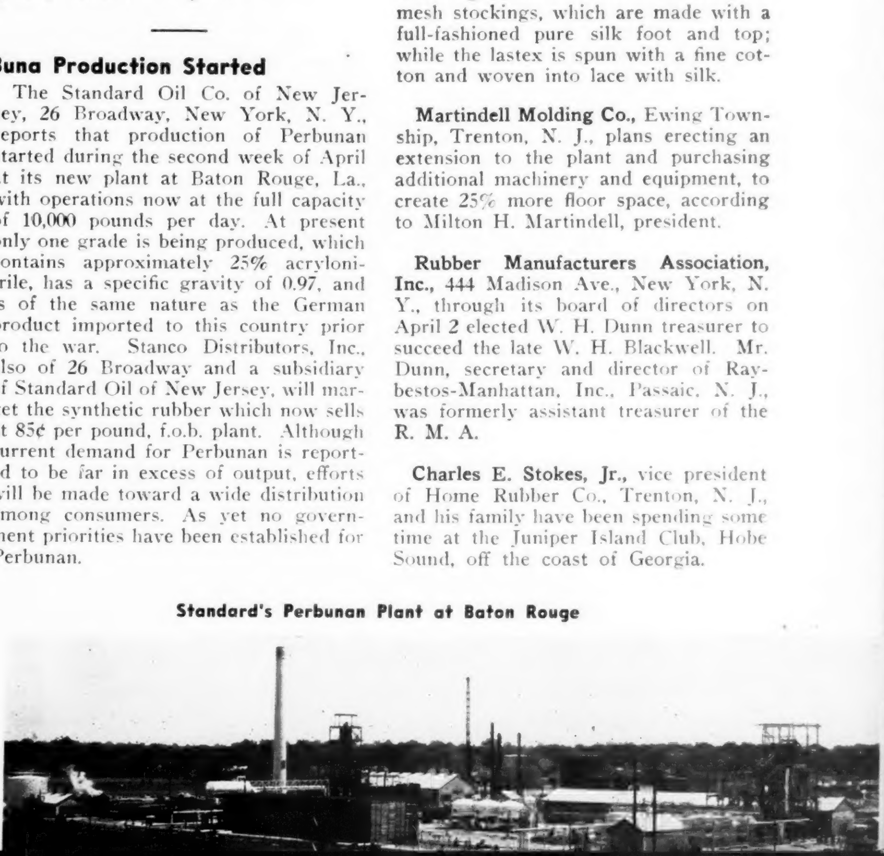
Triumph Hosiery Mills, Inc., 11 E. 36th St., New York, N. Y., is manufacturing "Lolita" Lace o' Lastex silk mesh stockings, which are made with a full-fashioned pure silk foot and top; while the lastex is spun with a fine cotton and woven into lace with silk.

Martindell Molding Co., Ewing Township, Trenton, N. J., plans erecting an extension to the plant and purchasing additional machinery and equipment, to create 25% more floor space, according to Milton H. Martindell, president.

Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., through its board of directors on April 2 elected W. H. Dunn treasurer to succeed the late W. H. Blackwell. Mr. Dunn, secretary and director of Raybestos-Manhattan, Inc., Passaic, N. J., was formerly assistant treasurer of the R. M. A.

Charles E. Stokes, Jr., vice president of Home Rubber Co., Trenton, N. J., and his family have been spending some time at the Juniper Island Club, Hobe Sound, off the coast of Georgia.

Standard's Perbunan Plant at Baton Rouge



L. Albert & Son, supplier of rubber machinery, reports its three plants, at Trenton, N. J., Akron, O., and Los Angeles, Calif., are running to capacity and the demand is better for both second-hand and new equipment. I. H. Albert has returned to the Pacific Coast branch after having spent two months at the Trenton office.

Pittsburgh Plate Glass Co., Grant Bldg., Pittsburgh, Pa., on April 3 named Executive Vice President Robert L. Clause president to succeed H. S. Wherrett, now filling the new office of vice chairman of the board of directors.

National Defense Advisory Commission, Washington, D. C., has announced the establishment of the Unit of Conservation in Materials Branch of the Production Division, headed by Robert E. McConnell, to direct the conservation, reclamation, and substitution of strategic metals and materials essential for defense.

The International Municipal Signal Association in its recently revised specifications on wire and cable adopted a color code based on shades in the standard eight edition card of the Textile Color Card Association. Besides white and black, standard shades specified for the matching of colored braids of fast dyed cotton are: orange, No. 60039; scarlet, No. 60068; Peking Blue, No. 60079; and emerald, No. 60105.

Federal Reserve Bank, New York, N. Y., recently published, from reports of 1,099 industrial and mercantile corporations, a study of profits earned during 1940, showing thirteen rubber and tire companies having aggregate net profits of $40,600,000, against the same sum in 1939, $23,100,000 in 1938, and $27,200,000 in 1937.

The Association of American Railroads has announced that on February 1, 1941, Class I railroads had more new freight cars on order than on any corresponding date in the past 15 years. The figure was 41,600, against 35,702 on January 1, 1941, and 34,559 on February 1, 1940. The Association also stated that loadings of revenue freight for the week ended February 15 totaled 721,176 cars, gains of 18.6% and 25.1% over the corresponding weeks in 1940 and 1939, respectively. The total for the week ended February 8, 1941, was 710,196 compared with 627,429 on the same day last year.

The United States Supreme Court, Washington, D. C., on March 31 in a 4 to 3 decision denied the right to sue as a "person" under the Sherman Anti-Trust to the Federal Government, which is trying to collect triple damages from 17 tire manufacturers charged with submitting identical and collusive bids four times. This decision, however, does not prevent the United States from suing to collect $351,158 which it claims to have lost through the alleged collusive bidding.

National Association of Purchasing Agents, 11 Park Place, New York, N. Y., will hold its twenty-sixth annual international convention and Inform-a-Show at the Stevens Hotel, Chicago, Ill., May 26 through 29. Among the exhibitors listed are Eagle Pencil Co., New York; Latex Fiber Industries, Inc., Beaver Falls, N. Y.; John A. Roebling's Sons Co., Trenton, N. J.; and Socony-Vacuum Oil Co., New York.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., from April 1 to May 30 is offering at a special price a Westinghouse automatic electric iron and a Koroseal ironing pad, product of the Sunlite Mfg. Co. Unprecedented sales and heavy advance orders marked the beginning of the campaign, necessitating big increases in production schedules.

OHIO

Firestone Tire & Rubber Co., Akron, last month announced a new rubber compound, known as weatherproofed rubber, that is said practically eliminates cracking of tread and sidewall rubber. This new non-checking rubber will have many applications where present rubber compounds are unable to resist the disintegrating effects of ozone, such as airplane tires at high altitudes, where the percentage of ozone content is greater, and farm tires, where broad surfaces of rubber exposed to contact with ozone in the air and long storage periods of tires on idle farm equipment have been responsible for excessive weather checking of farm tires. Firestone has been making farm tires of weatherproofed rubber for the past few months.

Firestone contact rail insulator guards have been adopted as standard by the Board of Transportation of the City of New York for all new and replacement construction on the Independent Division of the New York City Transit System. The primary function of the rubber guard is to protect exposed signal equipment as well as afford protection to subway employes in locations where they may come in close contact with the third rail.

The Wooster Rubber Co., manufacturer of "Rubbermaid" Housewares, Wooster, according to President J. R. Caldwell, to gain about 25% increased capacity, is erecting a 100- by 50-foot two-story addition to its plant for more finished stock and shipping facilities; present space used for this purpose will be devoted to manufacturing. As a result, about 50 extra employes will be hired. This marks the second additior to the plant in the past three years for Wooster Rubber, which was reorganized in July, 1934, to manufacture household rubber goods and has seen its business grow steadily since.

Goodyear Expansion

Jesse Jones, Federal Loan Administrator, announced on April 14 that the Defense Plant Corp., a subsidiary of the RFC, at the request of the War Department, has authorized the execution of a lease agreement with the Goodyear Aircraft Corp., subsidiary of the Goodyear Tire & Rubber Co., both of Akron, to provide for the construction and equipment of a manufacturing plant at an approximate cost of $3,600,000. About $2,250,000 will be used for land and buildings, and $1,350,000 for machinery and equipment. The factory will be of steel, brick, and glass, one story high, 1,000 feet long, and 400 feet wide.

The plant, to be adjacent to the present Goodyear plant in Akron, will be used for making parts for military aircraft.

The title to the expanded facilities will be held by Defense Plant Corp., and the property will be leased to the Goodyear company for operation.

Personnel Mention

On March 29, Paul W. Litchfield chairman of the board, awarded the Paul W. and Florence B. Litchfield Award of Merit as the outstanding Goodyear wholesale salesman of 1940 to Harry L. Powell, of Akron. Winner of the best "A" store manager award of 1940 was Benton M. Fleming, Fort Worth, Tex., and the best "C" store manager was Gaylord F. Crozier, Madison, Ind.

Goodyear has named Robert Maney, recently general foreman of the mills and calenders departments, to the position of Plant 1 superintendent made vacant by the resignation of J. P. McIntire, who left for California because of ill health.

Robert Lee, superintendent of Plant II Tires, has been transferred to Goodyear's Jackson plant as general superintendent in an exchange of jobs with D. E. Sheahan.

Personnel Director Fred W. Climer has announced the following shifts in the sales and advertising division. Butler Doolittle, for the past two years sales promotion manager, has been assigned to a new post in the sales division, manager of car and home supplies, and is succeeded in his former position by Lee J. Bornhofen, assistant manager of advertising service for the past six years. Transferred to the latter job is Galen G. Cartwright, who has supervised mechanical goods, shoe products, flooring, Airfoam, and Pliofilm advertising service.

National Rubber Machinery Co., 917 Switzer Ave., Akron, recently elected Paul A. Frank, president to succeed Nils Florman. A. L. Heston, for several years sales engineer for the National-Standard Co., Niles, Mich., is now vice president of National Rubber Machinery Co. and will have charge of engineering and sales. S. A. Fraine remains as a vice president of the company, and R. R. Haskins is now secretary and treasurer.

Goodrich Expanding Koroseal Production

The B. F. Goodrich Co., Akron, recently completed a $300,000 ultra-modern manufacturing plant which climaxes a program of capital outlays in the development of Koroseal in excess of $1,000,000 for the production of raw materials as well as of finished goods, according to Dr. H. E. Fritz, manager of Goodrich's synthetics division. The new plant, at the main factories, is of safety glass and steel with precautions against fire and explosions and will augment present production facilities in treating fabrics and manufacturing cements and lacquers, as well as start production of a special film for packaging materials and for general industrial use.

Dr. Fritz announced that the increased production capacity is "substantial." A new type of fabric spreader, handling fabrics up to 66 inches wide, will turn out millions of yards a year for domestic use in tablecloths, food coverings, garments, and yard goods, and for military purposes as raincoats, tarpaulins, covers, tents, and ponchos. A substantial part of current Koroseal cement production also is for national defense needs.

Raw materials for the new processing unit will be supplied from the factory erected last fall at Niagara Falls, N. Y., and from Goodrich's own chemical manufacturing division plants at Akron.

John L. Collyer, Goodrich president, recently announced that Koroseal is used as a coating on the anode terminals required for the electrolytic production of hydrogen peroxide. Heretofore German equipment had been employed.

Goodrich has granted exclusive sales rights in the United States for Koroseal textile roll coverings to The Sonoco Products Co., Hartsville, S. C., supplier to the textile trade.

Ameripol Demonstrations

The district staffs of the Goodrich tire division are conducting demonstrations throughout the country showing how the synthetic rubber, Ameripol, is made. Into a beaker containing synthetic latex is poured a quantity of dilute acid, similar to that used in coagulating natural latex on Far Eastern plantations. Upon stirring, the solution almost immediately begins to curdle, with the rubber content forming a spongy mass, which is then bounced.

At present Goodrich is producing Ameripol in a new plant with a daily capacity of six tons.

Personnel Activities

Mr. Collyer last month visited the Los Angeles, Calif., plant, which recently completed modernization of its major units. Mr. Collyer, who was met by F. E. Titus, assistant general sales manager, and J. C. Herbert, general manager of the California plant, declared he believed the nation's sources of supply of crude rubber were adequate, but that the main problem was ships to carry the rubber to the United States.

Wm. C. Gulick, according to G. E. Brunner, general manager of the automotive tire sales division, has been made manufacturers' sales representative in the Detroit, Mich., office. Mr. Gulick joined Goodrich in 1926 as a salesman in the Boston district and after two years was transferred to the foreign sales department, serving in Hawaii and the Philippines for a decade before being sent to Sweden as sales manager for the company there. When the war intervened, he returned to this country as retail supervisor in the Boston district.

Goodrich has leased a large storeroom and display room at Trenton, N. J., and a large vacant lot adjoining, where it will erect a building.

New Open-End V-Belting

Goodrich has announced a new line of open-end V-belting for application on drives where endless V-belts cannot be applied or can be put on only at considerable expense and trouble in tearing a machine apart to get at the sheaves. Made in maximum 50-foot lengths, the open-end V-belting comes in top widths of $^{21}/_{32}$, $7/8$, and $1\frac{1}{4}$ inches and in thicknesses of $7/16$-, $5/8$-, and $3/4$-inch. Angle in each case is 40 degrees. Metal fasteners are used. Engineering instructions on applying the belting to any particular installation are given, together with rules governing operating conditions.

Army Tanks Latex-Sponge Lined

J. H. Connors, Goodrich vice president, last month announced that the Army's new M-3 tank, 18 feet long weighing 25 tons and mounting 75-millimeter cannon and machine guns, provides protection from face injuries and body bumps for its seven-man crew by a lining of 100 pounds of air-cell latex sponge with the same cushioning qualities used in mattresses and upholstery. The protective lining applied to the interior of the tank at all hazardous points, also serves as insulation against extreme heat and cold.

Press Pad for Aircraft Factory

A rubber press pad, manufactured by the Goodrich company, has been installed on a 5,000-ton press for a British aircraft factory. The pad, one of the largest ever produced, weighs 4,000 pounds, is 14 feet two inches long, four feet three inches wide, and $10\frac{7}{8}$ inches thick, and will be used in a new method of fabricating parts for airplanes.

Seiberling Announcements

Benjamin Baldwin, who for 13 years was engaged in production work at the General Tire & Rubber Co., Akron, has joined the factory production staff of the Seiberling Rubber Co., Akron, and is working on special production assignments under Factory Superintendent Art Leedy.

Seiberling is applying to all tires leaving its factories a new, improved Velvet Tire Paint, giving a new, dull, satin finish. The company also is offering for the use of recappers, vulcanizers, and used car dealers this same black paint, marketed as S-5, ready for use, and B-5, concentrated.

Seiberling recently announced two new commercial tires, the improved Traction Lug type known as "T.L." with two-way tread of "affinite" compound and carcass of "Saf-flex" cord; and the Tractor Grader type of similar construction, with self-cleaning tread and center rib making the tire very efficient for its type in on-the-road service without detracting from its off-the-road efficiency.

The Oak Rubber Co., manufacturer of toys and novelties, especially balloons, Ravenna, last month celebrated its silver jubilee. During the quarter-century Oak has produced and distributed more than 500,000,000 balloons.

MIDWEST

Monsanto Chemical Co., St. Louis, Mo., on March 28 held a board meeting at which all officers of the company were reelected. The ten directors were reelected at the annual stockholders' meeting on March 25, when President Edgar M. Queeny reported immediate prospects of the company were favorable and sales volume of domestic units for the first two months of 1941 were about 30% greater than in the corresponding period of 1940.

Thirty-three rubber companies in the Midwest recently reported paying 16,811 employes $462,000 in wages. The number of workers was unchanged over the previous month, and the payroll disbursement was up 0.5%.

Belden Mfg. Co., 4647 W. Van Buren St., Chicago, Ill., according to President Whipple Jacobs, at a recent stockholders' meeting approved, effective May 1, 1941, a retirement pension plan for employes at a cost to the company of $260,000 for back service and of about $25,000 annually for future pension's. Designed to supplement the income received under the Social Security Act, the plan calls for employes who have reached the age of 35, but not 60, with five years' service with the company to contribute along with the company into the pension fund. Retirement takes place at the age of 65. The plan will be administered by the Connecticut General Life Insurance Co.

The Mid-Continent District of the American Petroleum Institute's Division of Production at its recent spring meeting elected George Berlin, of Skelly Oil Co., Pampa, Tex., chairman for 1941-1942. Among the members of the advisory committee are Mr. Berlin, J. S. Freeman, of Skelly Oil, Tulsa, Okla.; and C. E. Blackburn, of J. M. Huber Corp., Borger, Tex.

The Nineteenth Annual Midwest Safety Conference and Exhibit will be held at the Sherman Hotel, Chicago, Ill., May 6, 7 and 8. Paul Van Cleef, of Van Cleef Bros., Chicago, Ill., will preside at the session devoted to factors affecting the industrial safety of smaller plants.

Van Cleef Bros., 7800 S. Woodlawn Ave., Chicago, Ill., has operated 3,000 days, starting January 17, 1923, without a lost-time accident, which constitutes a record for a plant of its size, according to Noah Van Cleef, one of the three brothers who are partners in the firm.

NEW ENGLAND

General Latex & Chemical Corp. and **Vultex Corporation of America,** both of 666 Main St., Cambridge, Mass., have announced several changes in their branch addresses. The New York, N. Y., office has moved from 200 Church St. to 47 W. 34th St., and the Akron, O., one from 203 to 307 Akron Savings & Loan Bldg. The branch at 401 Water St., Baltimore, Md., has been closed but new offices have been opened at 5118 Wakefield St., Philadelphia, Pa., and 413 Castle Bldg., Montreal, P. Q., Canada.

The Aero-Tread Corp. of New York has reported that a section of the plant at Cranston, R. I., which it purchased in February, was destroyed by fire April 2 with an approximate loss of $50,000. President George A. Leavitt stated the loss is fully covered by insurance, and the insurance company has agreed to rebuild the destroyed section. He further declared that the fire will not affect operations because manufacturing will be started in a section of the plant remote from the portion destroyed. When the plant was bought, it was announced that about 100 persons would be employed when in full operation. Meanwhile the company is installing machinery for the manufacture of rubber products and production is expected to begin at an early date.

The Rhode Island rubber manufacturing industry was a material factor in the increased employment reported for February, 1941, as compared with February, 1940, and reached the highest February level since 1929. According to the State Director of Labor, the number of employes in the eight rubber manufacturing concerns from which returns were received was 2,662, or 4.7% more than in January and 14.1% over February, 1940. This is a larger percentage of gain than that of 12.7% shown for the entire industries of the State over a year ago and the 4.1% advance from the January figures. Payroll payments to rubber employes during February were 13% more than in January, and 29.6% more than in February, 1940.

American Wringer Co., Woonsocket, R. I., elected George R. Keltie president and treasurer to succeed the late Harold T. Merriman. Mr. Keltie was vice president, a post to which the directors have elected Harry A. Schlosser, previously factory manager.

Plymouth Rubber Co., Inc., Canton, Mass., through F. E. Harris, assistant general manager, has reported that arrangements have been made to purchase the Rockland Rubber Co., Rockland, Mass., which is in operation and equipped to manufacture proofing. Such a move was necessitated by the fire April 2 at the Plymouth plant, which completely wiped out the proofing department, but in no way affected the tape, heel and sole manufacturing, sundries, or rubber bands departments, all of which will be continued at Canton, with the manufacture of proofing scheduled for Rockland.

Everett T. Packard, 80, treasurer and a co-founder of the Avon Sole Co., Avon, Mass., died suddenly of a heart attack on March 27.

Pope Tire Co., 1347 Van Ness Ave., Fresno, Calif., is planning the erection of a vulcanizing plant at an estimated cost of $40,000.

CANADA

Dominion Ministry of Munitions and Supply, Ottawa, Ont., recently awarded the following war orders: *clothing*, Dominion Rubber Co., Ltd., Montreal, P. Q., $105,577, Miner Rubber Co., Ltd., Montreal, $15,600; *personal equipment*, Dominion Rubber, $30,000, B. F. Goodrich Co. of Canada, Ltd., Kitchener, Ont., $60,485. Capital expenditures included Dominion Rubber, $163,470; Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., $128,351; Gutta Percha & Rubber, Ltd., Toronto, Ont., $30,074.

Industrial Accident Prevention Associations, 600 Bay St., Toronto, Ont., on April 21 and 22 held its annual convention and exhibition of industrial safeguarding at the Royal York Hotel, Toronto.

Seiberling Rubber Co., of Canada, Ltd., Paton Rd., Toronto, Ont., according to Advertising Manager J. A. Thompson, is erecting a two-story 100- by 100-foot warehouse of brick and steel construction at its main plant at an estimated cost of $92,000. The building, to be ready for occupancy the latter part of June, was made necessary to create greater storing space in filling government orders. A portion of the building will be used for offices to allow also for needed manufacturing space. The plant is operating to full capacity.

Robert Stephen Jane, research development engineer, Shawinigan Chemicals, Ltd., Montreal, P. Q., recently addressed Montreal engineers on "Chemistry's New Building Blocks." He described oil refinery gases being used as raw materials in the production of many industrial products, including synthetic rubber, and forecast that the United States would be the leader in manufacturing these synthetics as Canada's limited population and lack of markets would cause her to lag behind.

Paul Jones, president, Dominion Rubber Co., Ltd., Montreal, P. Q., has been named to the committee of the "Wings for Britain" fund.

Industrial War Effort Urged

"Expanding Man-Power" is the title of a booklet, issued by the Industrial Accident Prevention Association, Toronto. Written as an answer to the question of Canadian employers and employes, "How can I help in Canada's war effort?" this booklet urges that all employable men be put to work, that the production of every individual worker be built up to the limit of his capacity, and emphasizes that industrial output must play a large part in the successful prosecution of the war. The possibility of improved use of the time and skills of trained men was particularly stressed, pointing out that an unskilled helper could do much of the work now being assigned to more skilled hands. Specific subjects discussed are: expanding payrolls, school cooperation, selecting a new employe, wage and salary administration, employe rating, and industrial relations.

F. P. A. to Discuss Conductive Rubber

At the forty-fifth annual meeting of the National Fire Protection Association International at the Royal York Hotel in Toronto, Ont., May 12 to 16 inclusive, which has a full schedule of papers, addresses, and committee reports relating to fire hazards, Prof. J. W. Horton, Massachusetts Institute of Technology, in an address on May 16 on the subject "Preventing Operating Room Explosions" will say that electrically conductive rubber is now available and its use for various items of hospital operating room equipment and for the shoes of doctors and nurses is advocated among other measures to reduce the static hazard.

The report of the Committee on Gases, to be given at the same session, will discuss this subject in some detail and provide a standard method for testing the electrical conductivity of rubber, which requires a specialized testing technique in order to secure results that will not be misleading, also, the Committee on Static Electricity under the chairmanship of E. J. Meyers, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., will mention conductive rubber in its report to be given at the general session, May 14.

British Rubber Co. of Canada, Ltd., Montreal, P. Q. Employes subscribed $116.50 to the French Canadian charities of Montreal.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., according to President A. G. Partridge in a letter to shareholders, enjoyed sales in the first quarter of 1941 considerably above those of the same quarter last year, with profits fully covering dividends for the period.

OBITUARY

Webster Norris

Webster Norris

WEBSTER NORRIS, who retired in 1937 as technical editor of INDIA RUBBER WORLD, died of a heart attack at his home in Hempstead, L. I., N. Y., on April 20, only two days after he had returned with his wife from a winter spent in Florida.

Mr. Norris, who was in his eighty-first year, was born in Charlestown, Mass., now a part of Boston, and after attending the grammar and high schools of that city attended the Massachusetts Institute of Technology, from which he graduated in 1881 with the degree of bachelor of science. His first work was as an analyst in steel and sugar refining industries, and a few years after his graduation he was chief chemist of the Chicago, Milwaukee & St. Paul Railway Co.

Mr. Norris soon saw, however, the need of chemical standardization of the materials, processes, and products of rubber manufacture. As a result, in 1887 he became chemist of the Boston Rubber Shoe Co. at the laboratory of its Malden plant, later becoming superintendent of the company's Plant No. 1. He was regarded as being one of the first, if not the first, of the early chemists to be employed regularly by an American rubber manufacturing company.

He remained with the Boston Rubber Shoe Co. eight years, and in 1895 became chemist for the Revere Rubber Co. Subsequently he served as superintendent with several important companies, among them the Gutta Percha & Rubber Mfg. Co., New York; The Canadian Rubber Co., Ltd., Montreal; the Republic Rubber Co., Youngstown, O.; and the New York Rubber Co., New York. He also lectured on the technology of rubber at M. I. T. and was granted several patents on rubber-working machinery and factory equipment, including a special loop for rubber boots, a roll for rubber mixing mills and a micrometer dial gage.

Mr. Norris was among the first regular contributors to INDIA RUBBER WORLD, starting to write for the paper soon after it was founded in 1889. He continued his contributions until 1917 when he became a member of the regular staff in charge of the chemical department, a position he retained until retirement. From 1917 he also conducted a private practice as consulting rubber technologist.

Mr. Norris, whose passing is keenly regretted by his former associates on this publication, is survived by his wife and two brothers.

Funeral services were held on Tuesday evening, April 22, at the Fairchild Funeral Home, Brooklyn, N. Y., with interment the following day in Cypress Hills Cemetery, Brooklyn.

Herbert Freundlich

CORONARY thrombosis caused the death, on March 30, of Herbert Freundlich, noted colloid chemist and author of many papers on the subject. Born in Charlottenburg, Germany, January 28, 1880, he attended Gymnasium Wiesbaden, Munich University, and Leipzig University. A Ph.D. degree was conferred upon him in February, 1903.

From 1903 to 1911 he was connected with the chemical laboratory at Leipzig, becoming in 1906 a licensed university lecturer and then a professor of physical chemistry and inorganic technology at Technische Hochschule, Braunschweig.

Herbert Freundlich

From 1916 to 1919, Dr. Freundlich worked on gas masks at the Kaiser Wilhelm Institute for Physical Chemistry and Electrochemie, Berlin-Dahlem. Then in January, 1919, the deceased left the Technische Hochschule and joined the Institute as life member and director of the division of colloid chemistry and applied physical chemistry and soon afterward was made associate director of the Institute. In 1923 he became an honorary professor at the University of Berlin and in 1930 was named to a similar post at Technische Hochschule, Berlin-Charlottenburg.

In 1933, however, Professor Freundlich resigned in protest against Nazi racial legislation and became a guest professor and research associate at University College, London, England. On January 1, 1938, he was appointed distinguished service professor of colloid chemistry at the Graduate School of the University of Minnesota, Minneapolis, Minn.

Professor Freundlich received an honorary Ph.D. from Altrecht University (Holland) in 1936 and in 1940 was elected a Fellow of the Royal Society, London. He also belonged to many scientific organizations, including the Chemical Society (London), American Chemical Society, Faraday Society, and Sigma Xi.

Funeral services were held on April 1 with interment in Lakewood Cemetery, Minneapolis.

He leaves his wife, a son, two daughters, two sisters, and three brothers.

Louis P. Destribats

LOUIS P. DESTRIBATS, former vice president and general manager of the Ajax Rubber Co., Trenton, N. J., died April 12 at his home in Trenton after a lengthy illness. Born in France 73 years ago, Mr. Destribats was chief chemist for many years at the Michelin Tire Co., Milltown, N. J., later removing to Trenton to take charge of the former Ajax Rubber Co.

He is survived by his wife, two daughters, two sons, and five grandchildren.

Requiem Mass was held at the Blessed Sacrament Church, April 15, with interment at St. Mary's Cemetery, Trenton.

Frederick Edel

FREDERICK EDEL, 53, assistant director of sales of the R. & H. Chemicals Department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., died April 13 at his home in Westover Hills, Del., after a prolonged illness. Born and educated in Germany, he came to this country as a youth and joined the R. & H. Chemicals Co. at New York in 1911. He transferred to Wilmington in 1930 when Du Pont acquired title to the R. & H. concern.

Solemn Requiem Mass was sung on April 16 in St. Joseph's-on-the-Brandywine Catholic Church. Interment was private.

His widow is the only survivor in this country.

FINANCIAL

Unless otherwise indicated, the results of operations of the following are after operating expenses, federal income taxes, and other deductions. Additional tax charges under the Revenue Act of 1940 have been made against earnings in many reports.

Anaconda Wire & Cable Co., (controlled by Anaconda Copper Mining Co.), New York, N. Y. For 1940: net profit, $1,717,468, equal to $4.07 each on 421,981 capital shares, against $648,899, or $1.54 a share in 1939.

Armstrong Rubber Co., Inc., West Haven, Conn. Last quarter, 1940: net income, $121,488, equal to $1.61 a share on combined Class A and B common.

Baldwin Locomotive Works, Philadelphia, Pa., and subsidiaries, including the Midvale Co. Year ended March 31, 1941: consolidated net income, after all charges including provision for federal and Pennsylvania income taxes and excess-profits tax of $1,812,000 and deduction of minority interest of Midvale Co., $2,104,381, equal, after preferred dividend requirements of $156,249, to $1.89 each on 1,028,722 common shares, contrasted with $1,414,289, or $1.25 a common share, in the preceding 12 months.

Baldwin Rubber Co., Pontiac, Mich. March quarter: unaudited net profit, $248,979, equal to 79¢ each on 315,654 capital shares, against $109,875, or 35¢ a share, last year. Nine months to March 31: net profit, $539,040, or $1.71 a share. Owing to change in the fiscal year which now ends June 30, no comparison with the similar period a year ago is available.

Barber Asphalt Corp., New York, N. Y. For 1940: total dollar volume for business transacted, $11,120,874, against $12,881,752 in 1939. Loss for 1940 after all charges, $188,796, contrasted with profit of $544,452 in 1939. Current assets, December 31, 1940, $5,889,229, current liabilities, including $96,021 reserves for workmen's compensation and guarantees $1,036,533.

Belden Mfg. Co., Chicago, Ill. For 1940: net income, $373,128, against $378,201 in 1939; net sales, $6,254,660, against $4,923,911; current assets, $1,092,359, current liabilities, $635,261, against $802,162 and $591,984, respectively, on December 31, 1939; cash, $378,279, against $158,938.

Brown Rubber Co., Inc., Lafayette, Ind. Fifty-three weeks to January, 1941: net profit, $33,013, equal to 16¢ each on 200,000 capital shares, contrasted with net loss of $53,787 in 1939.

Brunswick-Balke-Collender Co., Chicago, Ill. For 1940: net profit, $2,383,497, after all charges and taxes, equal, after preferred dividend requirements, to $5.05 each on 444,455 common shares, against $2,037,435, or $4.23 a share, in 1939; net sales, $16,901,234, against $13,745,522.

Collins & Aikman Corp., Philadelphia, Pa., and subsidiary. Year ended March 1, 1941: consolidated net income, $3,105,169.70, equal, after preferred dividend requirements, to $5.15 a common share, against $2,556,895.26, or $4.16 a share, in the previous fiscal year.

Converse Rubber Co., Malden, Mass. Year to February 1, 1941: net income, $16,978, against $2,775 in year to January 27, 1940.

Crown Cork & Seal Co., Inc., Baltimore, Md., and wholly owned domestic subsidiaries. For 1940: net profit, after all charges and taxes, $2,525,968, equal, after preferred dividend requirements, to $3.90 each on 517,614 common shares, excluding 13,617 treasury shares, contrasted with $1,956,048, or $2.80 a common share, in 1939; net sales, $33,797,832, against $28,233,361.

Crown Cork International Corp., Baltimore, Md., and wholly owned subsidiary. For 1940: net profit, $181,413, including $249,908 net in dividends and profits from subsidiaries in foreign countries, financial statements of which are not included.

Detroit Gasket & Mfg. Co., Detroit, Mich. For 1940: net profit after excess profits taxes, $488,739, equal, after preferred dividends, to $2.02 each on 214,250 common shares, against $448,512, or $1.82 a share, in 1939.

Dewey & Almy Chemical Co., Cambridge, Mass. For 1940: consolidated net profit, $502,751, equal after preferred dividend requirements, but before setting aside $26,690 for additional foreign and domestic taxes assessed in 1940 against earnings of 1939 and 1938, to $1.85 each on 217,397 shares of common stock, against $2.66 each on 193,535 common shares for 1939; consolidated gross sales, $5,279,401, up 3.9%.

Dryden Rubber Co., Chicago, Ill. For 1940: net income, $400,009, against consolidated net income of $152,504 in 1939.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. First quarter, 1941: net income, after providing $17,143,000 for estimated federal taxes and $3,500,000 for contingencies, $1.77 a common share, against $2.04 a common share in the same quarter last year, when $4,205,000 was set aside for federal taxes and no provision made for contingencies.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., Canada. For 1940: net income, $146,584, equal, after preferred dividends, to $1.86 each on 56,768 common shares, against $223,992, or $3.22 a share, in 1939; current assets, $3,380,674, current liabilities, $923,058; working capital, $2,457,616, against $2,406,935 at the end of 1939; taxes, $193,102, against $59,923.

Flintkote Co., New York, N. Y., and subsidiaries. Year ended March 22, 1941: net income, $1,628,020, or $2.37 a share, against $1,444,207, or $2.13 a share, in the previous 52 weeks; net sales, $21,542,558, against $17,444,915.

Garlock Packing Co., Palmyra, N. Y., and subsidiaries. For 1940: net profit, $1,132,516, equal to $5.41 each on 209,250 common shares, against $1,004,585, or $4.80 a share, in 1939.

Gates Rubber Co., Denver, Colo. Year to November 30, 1940: net income, $882,506, against $1,192,327 in the preceding year; net sales, $14,808,649, against $13,140,628.

General Cable Corp., New York, N. Y. For 1940: net income, $2,455,362, against $733,166 in 1939.

General Electric Co., Schenectady, N. Y. For 1940: net income, after provision for all charges, $56,241,000, equal to $1.95 a common share, against $41,235,644, or $1.43 a share, in 1939; net sales, $411,938,000, against $304,680,000; orders received, $654,190,000, an all-time high, and 81% above 1939 orders; taxes $54,943,000, against $21,013,000.

Jenkins Bros., Bridgeport, Conn. For 1940: net income, $345,783, against $246,603 in 1939.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Wringer Co., Inc.	Com.	$0.15 irreg.	May 1	Apr. 28
Armstrong Cork Co.	Com.	$0.25 interim	June 2	May 5
Armstrong Cork Co.	Pfd.	$1.00 q.	June 16	June 2
Canada Wire & Cable Co., Ltd.	"A"	$1.00 q.	June 15	May 31
Canada Wire & Cable Co., Ltd.	"B"	$0.50 interim	June 12	May 31
Canada Wire & Cable Co., Ltd.	Pfd.	$1.625 q.	June 15	May 31
Carborundum Co.	Com.	$1.25	Mar. 31	Mar. 20
Crown Cork & Seal Co.	Com.	$0.25 irreg.	Apr. 30	Apr. 16
Dayton Rubber Mfg. Co.	Com.	$0.25	May 1	Apr. 17
Dayton Rubber Mfg. Co.	"A"	$0.25	May 1	Apr. 17
DeVilbiss Co.	Com.	$0.50	Apr. 15	Mar. 31
DeVilbiss Co.	7% Pfd.	$0.175 q.	Apr. 15	Mar. 31
General Cable Corp.	Pfd.	$1.75 accum.	May 1	Apr. 28
Goodyear Tire & Rubber Co.	Com.	$0.25	June 16	May 15
Goodyear Tire & Rubber Co.	Pfd.	$1.25	June 16	May 15
Mid-West Rubber Reclaiming Co.	Com.	$0.50 q.	May 1	Apr. 21
National Automotive Fibers	Pfd.	$0.15	May 15	Apr. 21
Okonite Co.	Com.	$1.50	May 1	Apr. 22
Okonite Co.	6% Pfd.	$1.50 q.	June 2	May 15
Pahang Rubber	Com.	$0.10	Apr. 1	Mar. 25
U. S. Rubber Reclaiming Co.	Pfd.	$0.50	Apr. 15	Apr. 8
S. S. White Dental Mfg. Co.	Com.	$0.25	May 2	May 17

Hewitt Rubber Corp., Buffalo, N. Y., and subsidiaries. For 1940: earnings, after all charges, $280,701, or $1.68 a common share, against $358,810, or $2.13 a share, in 1939.

Intercontinental Rubber Co., New York, N. Y., and subsidiaries. For 1940: net income, $323,614.38, against $141,676.53 in 1939; current assets, $1,402,811.98, against $1,136,113.42; current liabilities, $266,479.49, against $171,181.40.

Lima Cord Sole & Heel Co., Lima, O. March quarter: net income, $20,662, equal to 18¢ each on 111,689 capital shares, against $2,660, or 2¢ a share, last year.

Mansfield Tire & Rubber Co., Mansfield, O. For 1940: net loss, $297,913, against net income in 1939 of $501,796; net sales, $8,109,471, against $12,408,321.

Master Tire & Rubber Co., Akron, O. For 1940: net income, $3,343; net sales, $3,416,000.

Parke, Davis & Co., Detroit, Mich., and subsidiaries. For 1940: net profit, after deductions for depreciation, amortization, income taxes, provision of $100,000 for federal excess profits tax and $140,000 for foreign profits not transferred to the United States, $8,187,712, equal to $1.67 each on 4,895,834 shares of no par capital stock, contrasted with $9,254,202, or $1.89 a share, in the preceding year.

Phelps Dodge Corp., New York, N. Y. For 1940: consolidated net income, alfter all charges except mine depreciation, $12,603,970, equal to $2.49 each on 5,071,260 capital shares, against $12,278,601, or $2.42 a share, in 1939; taxes $7,053,000 against $5,523,000.

Servus Rubber Co., Rock Island, Ill. Year ended February 28, 1941: net income, $194,107 equal to 99¢ each on 172,761 shares of common stock, against $161,376, or 80¢ each on 172,760 shares, in the previous fiscal year.

FROM OUR COLUMNS

50 Years Ago—May, 1891

"Rubber shoes," said the smart clerk, "are of two kinds, the bad and the very bad." (p. 225)

The late Jared H. Canfield, who founded the Canfield Rubber Co., became connected with the Goodyear Metallic Rubber-Shoe Co., at Naugatuck, Conn., about the year 1840. (p. 241)

The details of completing the organization of the United States Rubber Co. seem to have proceeded slowly during the past month. (p. 243)

Among other evidences of progress is noted the use of asbestos in connection with India-rubber for gaskets, woven washers, and woven tape for making steam- and water-joints. (p. 249)

The Mackintosh company's rubber factory at Manchester collapsed on May 7, full of employes. (p. 249)

There is no generally accepted method of keeping records of rubber stocks in this country, brokers exchanging information one with the other and thus forming estimates of the total amount of rubber in the market. (p. 252)

What is probably the oldest vulcanizer in the world was recently taken out of the works of the Boston Belting Co. It was set up in 1830, and has been used almost continuously ever since. (p. 253)

25 Years Ago—May, 1916

The first dirigible owned by the United States Navy required 2,500 yards of double texture fabric for the outer envelope. This fabric was furnished by the United States Rubber Co. (p. 401)

The final decision of the courts in favor of Louis H. Perlman establishing the validity of his patents on the demountable rim is of great importance. Although applied for in May, 1906, the patent (No. 1,052,270) was not granted until February, 1913. (p. 402)

France was the pioneer country in the manufacture of automobile tires. (p. 404)

Research carried out by I. I. Ostromyslenski, shows that vulcanization by means of trinitrobenzene or benzoyl peroxide takes place at ordinary temperature. (p. 410)

A tire which is guaranteed for 5,000 miles must have behind it a responsible organization and a corps of experts in every stage of manufacture. (p. 430)

The suggestion has been made by an Eastern advertising agency to change Ohio's historic appellation, "The Buckeye State" to "The Rubber Plant State." (p. 432)

Nearly completed additions will make the plant of The B. F. Goodrich Co., much the largest rubber factory in the world. (p. 432)

U. S. Crude and Waste Rubber Imports for 1941*

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Totals 1941	Totals 1940	Balata	Miscellaneous	Waste
Jan. ....*tons*	82 095	3,046	646	655	99	292	86,833	72,520	73	870	85
Feb.	70,335	1,968	656	535	170	309	73,973	43,088	82	709	66
Mar.	83,835	1,725	371	670	90	432	87,123	59,277	85	1,012	38
Total 3 mos., 1941 ......*tons*	236,265	6,739	1,673	1,860	359	1,033	247,929	......	240	2,591	189
Total 3 mos., 1940 ......*tons*	165,221	6,946	1,078	663	146	831	......	174,885	271	1,623	301

**Compiled from The Rubber Manufacturers Association, Inc., statistics.*

Shipments of Crude Rubber from Producing Countries—Long Tons

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Thailand	French Indo-China	Total	Philippines and Oceania	Liberia†	Nigeria (incl. Brit. Cameroons)	Other Africa	South America	Mexican Guayule	Grand Total
1939 ..	376,800	372,000	61,000	9,200	6,600	11,900	24,000	41,800	65,200	968,500	2,100*	5,400	2,800	6,600*	16,100	2,900	1,004,400
1940 ..	540,417	536,757	88,937	13,649	9,668	17,623	35,166	43,940	64,437	1,350,594	2,365*	7,223	2,907*	7,200*	17,601	3,974	1,391,864
1940																	
Jan. ..	26,229	54,148	7,698	839	833	1,858	2,256	5,722	5,238	104,821	185	1,191	147	600	1,550	389	108,883
Feb. ..	45 651	37,960	8,946	2,030	892	1,164	2,678	4,307	6,931	110,559	94	477	234	600	1,662	239	113,865
Mar. ..	47,885	41,619	5,305	1,070	871	1,050	3,526	3,111	3,551	107,988	178	548	343	600	1,482	346	111,485
Apr. ..	24,607	43,945	4,144	817	990	1,799	2,951	1,834	2,927	84,014	203	598	120	600	1,159	317	87,011
May ..	57,874	40,335	7,337	972	1,046	1,370	2,696	2,582	4,578	118,790	195	364	361	600	2,305	331	122,946
June ..	45,471	44,809	5,603	841	712	1,421	4,077	2,178	2,730	107,842	168	405	127	600	1,080	101	110,323
July ..	42,861	60,671	7,330	884	310	1,767	2,494	4,253	4,045	124,615	169	342	298	600	1,035	443	127,502
Aug. ..	45,872	46,631	8,139	994	75	1,593	2,640	4,545	7,337	117,776	285	308	328	600	1,233	327†	120,857
Sept. ..	58,892	44,032	9,985	1,258*	61	1,743	2,404	3,247	9,303	130,925	165	323	145	600	1,295	349	133,802
Oct. ..	52,767	50,139	8,127	1,332*	509	1,693	2,564	3,355	2,082	122,568	275	1,024	404	600	1,860	348	127,079
Nov. ..	36,045	37,117	5,623	1 331*	1,295	1,137	3,360	3 463	6,715	96,086	248	830	200*	600	1,513	392†	99,869
Dec. ..	56,263	35,351	10,700	1,331*	2.074	1,028	3,520	5,343	9,000	124,610	200	813	200*	600	1,427	392†	128,242
1941																	
Jan. ..	37,804	58,593	7,866	1,479*	955	2,085	2,445	2,137	9,058	122,422	250*	750*	200*	600	2,103	250*	126,575
Feb. ..	27,414	42,275	4,346	1,479*	1,022	1,686	2,922	4,137	5,000*	90,281	200*	750*	200*	600	1,500*	250*	93,781

* Estimated. †Guayule rubber imports into U.S.A. provisional until export figures from Mexico are received. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

GREAT BRITAIN

The Rubber Export Group

The executive committee of the General Rubber Goods Section of the Rubber Export Group has not allowed the difficulties created by the war to prevent it from holding several meetings at which the special problems of the branch were discussed. The work imposed by the new conditions has required the compilation for the first time in the history of the industry of an "Index of General Rubber Goods Manufacturers' Products." The products made by each member of the General Rubber Goods Section are listed. When any of the lines are discontinued, manufacturers advise the Group secretary. The Index is already proving very useful in dealing with inquiries.

Overseas trade continues to occupy the Rubber Export Group, and undiminished efforts are being made to expand trade in the British countries and in South America. Various methods of propaganda have been under consideration, but it has been decided to await the report of the South American mission before undertaking anything definite in this direction. Larger manufacturers, which are already represented in most of the markets still open to British trade, but who are unable to give orders proper attention, are sub-contracting with other, more favorably placed members of the Group.

The Rubber Export Group, which already handles licenses for timber for export packing, steel and wire for the tire industry, and wire for hose armoring, will now also deal with the industry's requirements of starches, dextrines, and probably before long, wood wool.

Reorientation of Research Suggested

Some interesting correspondence, in the one case on the subject of synthetic v. natural rubber, and in the other on the application of latex to fibers, has appeared in the February 22, 1941, issue of *India Rubber Journal*. In the first instance, F. D. Ascoli, managing director of Dunlop Plantations, Ltd., elucidates what he really meant when in an earlier letter he called for a reorientation of research. What he had in mind, he states, was chiefly the intensification of research into the properties of natural rubber to meet the threat of synthetic rubber in its main industrial uses, primarily the production of tires. He desires added research to improve the aging qualities, abrasion resistance, heat conductivity, cracking resistance, etc., of natural rubber. While rubber technologists are working in this direction, the plantation industry has not made these problems the subject of intensified research. Recent research at the Rubber Research Institute of Malaya has shown that differences exist in the quality of rubber produced by individual trees. Mr. Ascoli suggests that selection might be refocused to give qualitative (instead of quantitative) advantages and that trees selected for reproduction would be those yielding rubber of superior quality. Good results have been obtained by controlling the quality as well as the quantity of the product of other types of trees and should be possible also with *Hevea*.

Application of Latex to Fibers

In the second letter, J. Wilson, director of research, British Rubber Producers' Research Association, refers to notes by Dr. Schidrowitz in which a summary is given of M. C. Teague's address before the New York Section of the American Association of Textile Chemists & Colorists on "Some Recent Fiber Latex Developments." Mr. Wilson referred particularly to the iso-electric dispersions mentioned, stating that both in regard to technique employed and results obtained, the process described by Schidrowitz is remarkably like a process evolved by Dr. C. M. Blow when he was working under B. H. Wilsdon, director of the Wool Industries Research Association, on an investigation instituted jointly by the British Rubber Producers' Research Association and the Wool Industries Research Association.

Normally rubber particles in latex are negatively charged,

and since textile fibers, when introduced into an aqueous medium, are also normally negative, there is no deposition of rubber on the fibers. However Dr. Blow succeeded in producing a latex with reversed charge which is now marketed in England under the name of Positex and is available both vulcanized and unvulcanized. With the possible exception of moth-proofing, it possesses all the properties and applications claimed for the United States Rubber Co. product.

Positex is already used for making special felts for the shoe trade and for a waterproof crepe bandage; while certain firms are collaborating with the Technological Department of the British Rubber Producers' Research Association in attempts to produce an improved fiber board, a substitute leather, special felts for the clothing trade, etc., with the aid of Positex.

This latex is said to have remarkable possibilities in the textile field. By its use designs can be printed on fabrics which, when brushed up, show novel and beautiful effects. It enormously increases the wearing properties of rugs and carpets; it gives lightly twisted yarns the strength expected of tightly twisted yarn, thus making possible the production of luxury fabrics which have a very soft feel and yet are strong.

Dr. Blow's processes are covered by British patent Nos. 483,496 and 497,793, and B.P. Applications 8760/40, 15985/40, 166/41.

The United States Patent Office, Mr. Wilson says in conclusion, refused corresponding American patents on the basis of citations which, as far as he could see, bore no relation whatsoever to the work in England so that the American field is quite open.

GERMANY

Mipolam Flooring

The vinyl polymerizate known as Mipolam has for some time been used in making floor coverings, which are claimed to be completely resistant to aging and not to be permanently affected by the influence of light, heat, or oxygen. Consequently this flooring does not lose either its elasticity or sound deadening powers. It is unaffected by sea water, is non-flammable, odorless, and resistant to mold and bacteria, qualities which make it particularly useful on ships. It has unusual resistance to abrasion and shows little sign of wear even after years of hard usage. Lukewarm or cold water and soap suffice for cleaning, and as it has a very smooth surface, it should only be lightly waxed at long intervals, if at all. Highly decorative effects are said to be obtainable with Mipolam flooring as it is available in a variety of delicate shades. Because of its special properties this new flooring already finds considerable use in chemical factories, laboratories, hospitals, banks, theaters, stores, restaurants, hotels, etc.

As in the case of rubber flooring, Mipolam requires great care in laying and in fact is not sold to any firm that cannot produce evidence that its men are expert in laying Mipolam or rubber flooring. It must be laid on surfaces that are perfectly dry, even, resistant to pressure and rigid. None of the adhesives usually employed in cementing floor coverings is suitable for Mipolam, which requires special adhesives that are also polymerization products. Among the latter are the Cosals and Lucrylans, produced from native materials. Cosal Type U 990, thinned with Cosal thinner U 425 is especially recommended. This cement is very adhesive on any type of floor and, when dry, yields a film that will not become brittle. It is waterproof and resistant to acids, oils, benzine, molds, and bacteria.

Moving Restricted

On January 15, 1941, the Government issued an order forbidding companies to move factories, management, and administration offices from one province or district to another without special authorization. If the undertaking is of special economic importance or the removal involves the shifting of more than 500 employes, the permission must be obtained from the Minister of Economics.

Synthetic Resin Foam

Lately a new insulator designed to take the place of cork for use in cold storage rooms has appeared on the market. This is a condensation product of urea and formaldehyde, worked to a foam, which is poured into molds and allowed to dry and cool. Iporka, as the new material is called, is obtainable in layers cut to the desired size and shape or in flakes. It absorbs slightly more moisture than does cork, but tests running for about 1½ years show that it keeps very well and retains its insulating powers. The material is therefore considered a very suitable substitute for cork, when the proper precautions are taken to offset its greater sensitivity to water.

Thermal Degradation of Buna S[1]

One of the most important problems that had to be met before Buna S could be used on an adequate scale was the overcoming of that stiffness which makes it so hard to process. It can be softened by prolonged mastication in up-to-date mills, but this action consumes too much time and power. The addition of appropriate plasticizers in the required amounts has been tried, but this has an injurious affect on the quality of the final product. In 1937 a method of reducing the molecule of Buna S was developed which has since become known as thermal degradation or thermal decomposition. This is the method now predominantly used in Germany, and credit is given to it for the fact that Germany is now able to use synthetic rubber successfully on a large scale. Buna S is available in the form of crumb, sheet, and shredded sheet, and the latter form is generally preferred for degradation purposes.

The shredded buna is spread on racks to a definite, constant thickness; the racks are introduced into degradation kettles where the material is subjected to thermal treatment in the presence of air or oxygen. The main requirements for obtaining a uniform final product are thorough revolution of air and uniform temperature distribution in the interior of the kettle. In most modern factories special degradation kettles are employed which have the necessary attachment for supplying a stream of heated compressed air.

The chemistry of the degradation process has not yet been explained. It is certain, though, that the presence of oxygen is essential; no softening occurs in nitrogen or steam. A part of the phenyl-β-naphthylamine, which is incorporated as a stabilizer for the buna prior to marketing, is used up, but what remains normally suffices to give the vulcanizate anti-aging protection.

When Buna S is subjected to treatment, plasticity first increases very rapidly, at the same time the viscosity of a 4% benzol solution decreases. After reaching a minimum, hardness and viscosity increase again. This minimum may be called the resinification point, for if the thermal treatment is prolonged beyond this point, the adhesive properties of the material progressively decline, the "elastic portion"[2] increases (seriously hampering extrusion and calender work), and, if continued for a long time, a hard brittle, translucent substance is obtained which is no longer soluble in organic solvents. It is evident, therefore, that after a certain stage of softening has been reached, a cyclization reaction develops.

In softening buna by this method, care must be taken, naturally, never to reach this point of resinification. The proper temperature and duration of treatment are thus important. For though a higher temperature increases the rate of softening, the danger of cyclization is also increased; furthermore too high a temperature and too short a period of treatment prevent the obtaining of a uniform final product. It has been found that heating should be continued for periods of not less than 30 minutes and at a temperature of around 150° C.

Measurement of Plasticity—Defo Hardness

The plasticity of the material before and after it has been treated is measured usually by the deformation method, known as the Defo method, worked out at the Continental Caout-

[1] "The Plastification of Buna." H. Hagen, *Kautschuk*, Nov., 1938, pp. 203-10; "Laboratory Method for the Degradation of Buna S and Buna SS." W. Esch and R. Nitsche, *Kunststoffe*, Aug., 1940, pp. 233-34; "Degradation Experiments with Buna S." St. Reiner, *Kautschuk*, Nov., 1940, pp. 138-39; "Regulating Buna Degradation in the Factory." A. Springer, *Gummi-Ztg.*, Jan. 3, 1941, pp. 18-20.

[2] In this connection plasticity is defined as the irreversible deformation or distortion under definite conditions; while elasticity is the reversible distortion or deformation. Total deformation is elasticity plus plasticity. Thus the "elastic portion" is the reversible part of the total deformation

chouc Co.'s laboratory. This process employs two plates with diameters equal to that of the test piece. The test pieces are cylinders ten millimeters high and ten millimeters in diameter and are compressed to four millimeters in 30 seconds at a measuring temperature of 80° C. The weight, in grams, required to do this, is called the Defo hardness and is a measure of the plasticity, which naturally is lower, the greater the Defo hardness is. The amount of recovery, in 1/100 millimeter is measured 30 seconds after the sample has been released and is expressed in per cent. of the original height of ten millimeters. Thus 1,500 - 70 signifies 1,500 grams required to compress the sample to four millimeters in 30 seconds, and recovery to seven millimeters 30 seconds after release.

Advantages and Disadvantages of Thermal Degradation

Thermal treatment of Buna S offers various advantages—by its aid the power needs in mixing, time for mixing, and size of pieces treated are on a level with that usual for natural rubber; hence the mixing process becomes cheaper. With a higher degree of softening a kneading machine can be used.

Dispersion of fillers is improved, which in some cases increases the strength of the product and always reduces the amount of waste. On the other hand, the vulcanizing ability of the buna is somewhat decreased, and the mechanical properties are also affected, the impairment depending on the degree of softening. Increased amounts of sulphur and accelerator are needed, and in general much greater care in compounding is essential.

Thermally softened Buna S continues to show a greater tendency to shrink than natural rubber having the same plasticity, and it does not give such smooth extruded and calendered products so that the addition of a certain (if reduced) amount of softener must still be used. There is a similar difference in the processing qualities of degraded and masticated Buna S which favors the latter. Subsequent thermal treatment of masticated Buna does not destroy this advantage so that thermal treatment of Buna S is sometimes preceded by brief mastication.

New Problems

The use of degraded buna has brought with it various new problems, and it has been found necessary to make laboratory degradation tests of a new charge of Buna S (or Buna SS) before submitting the entire new lot to treatment. Esch and Nitsche and also St. Reiner have devised methods and apparatus for conducting such tests which are claimed to give satisfactorily reproducible results. Reiner's first experiments in this direction were concerned with the effect of the amount of air in the degradation kettle, and he found that the smallest permissible amount for 50 grams of buna crumb is about 20 liters per hour if the quantity of air is evenly distributed. The amount of air hardly affects the Defo number and viscosity, but reduced amounts of air lead to an increase in the "elastic portion" giving rise to greater difficulty in processing.

A. Springer found a mathematical formula to express the kinetics of the degradation process. He used the data he obtained as a basis to construct a slide rule by means of which, he claims, degradation conditions can be determined and with the help of which various problems that arise in the factory can be solved, as when it is required to find Defo values not normally worked with, it is desired to increase the output of the kettle by raising the temperature (or less frequently, the pressure), or it is necessary to meet variations in temperature and pressure due to improper functioning of the regulation of the degradation kettle.

EUROPEAN NOTES

The Norske Kalosje & Gummivarefabrik, Oslo, Norway, has increased its capital from 480,000 to 600,000 kroner by transferring 120,000 kroner from the reserve funds.

Rubberfabrik Triton N.V., a new concern in Amsterdam, Holland, will manufacture and trade in rubber goods. The company has also acquired patents and licenses for the pro-

duction of synthetic rubber and will make various types of goods from this material.

The A.S. Skandinavisk Gummi Compagnie, Odense, Denmark, which specializes in rubber clothing, is under new management. Instead of P. K. Evers, the head of the firm is now Fritz Auckenthaler von Thurnstein; while the other members of the board of directors are Helge C. Fleischer, Aage A. H. Backhaus, Alexis Green-Anderson, and Theodor Hansen, who take the place of R. H. Andersen, B. Benzon, K. Bing, and H. Michaelsen.

NETHERLAND INDIA

Behavior of Latex When Vulcanized

In his latest researches J. W. van Dalfsen[1] has observed some interesting differences in the behavior of fresh latex, preserved old latex, and purified latex, when vulcanized. It is known from Schidrowitz's patents that when latex is vulcanized and subsequently dried at room temperature, a rubber is obtained which has the properties of dry-vulcanized rubber and so has a tensile strength and elasticity corresponding to that of latex films that have been dried first and then vulcanized. The Schidrowitz process is employed for the manufacture of articles which can be used without dry vulcanization. But it has been found that when fresh latex is vulcanized under certain definite conditions, a rubber is obtained which does not exhibit adequate tensile strength and elasticity unless it is perfectly dry. Under ordinary atmospheric condition it is "short", seems to be over-vulcanized, and has practically no tensile strength. Since, however, a second dry vulcanization will improve the mechanical properties, there can here be no question of over-vulcanization in the usual sense.

At that particular stage in the vulcanization of the latex, when films without tensile strength are obtainable after drying, the addition of acid to the latex causes the formation not of a coagulum, but of a flocculate, and no other means, chemical, or mechanical, will help to achieve a coherent coagulum. This form of latex has no adhesive properties. It has been found that the flocculation results only if vulcanization is carried out in the presence of ZnO and an accelerator, at temperatures not exceeding 100° C. and under such conditions that hydrolysis of the serum constituents remains at a minimum. The capacity to flocculate is lost when fresh latex is stored in an alkaline state or is purified.

Under the same conditions purified latex or latex that has been aged yields a coagulum which, depending on the degree of purification and the hydrolysis of the non-rubber substances, will vary from one that is completely coherent to one that has so little cohesion that stirring will break it up into granules.

In tests to discover the causes of these differences, the combination of sulphur was considered first. While this work yielded new viewpoints, it did not help clarify the problem on hand.

The investigation of the non-rubber constituents was more fruitful. It was found that the nitrogenous substances are not chemically united to the rubber particles in the latex by vulcanization, but there is increased adsorption induced by the presence of ZnO. In addition there is also considerable adsorption of zinc, from which it is assumed that during vulcanization a reaction takes place between the zinc-ammonia complex and the nitrogenous compounds in the adsorption skin of the latex particles. Under identical conditions far more zinc is adsorbed on the particles of fresh than of purified latex.

These findings suggested that the difference in the behavior of fresh and purified latex is due to the difference in the thickness and composition of the adsorption layer on the rubber particle. In the case of the fresh latex, vulcanization in the presence of ZnO results in the rubber particles being so thickly coated that the mutual forces of attraction between the particles, by which the tensile strength is determined, are greatly

[1] "Vulcanization of Latex. Differences in the Behavior of Fresh, Old, and Purified Latex." Communication No. 24 of the Rubber Research Division of the West Java Experiment Station, West-Java. Reprinted from *Arch. Rubbercultuur*, 24, 8, 598-632 (1940).

reduced. This effect is still more marked when moisture causes the adsorption skin to swell. Hence the structure of a rubber film obtained by drying vulcanized fresh latex must necessarily be discontinuous, and though the individual rubber particles may be normally vulcanized, they are held together not by chemical bonds, but by Van der Waal forces. This structure differs considerably from that of plasticized, dry-vulcanized rubber which is assumed to have a continuous structure of long rubber molecules that wind over and along each other and are chemically bridged by sulphur bonds. This structure, it may be added, is that usually accepted for vulcanized rubber, but for reasons of caution, the author for the present prefers to assume it for plasticized rubber.

Export Data

Corrected figures for 1940 crude rubber exports from Netherland India total 537,188 tons, instead of 531,173 tons. Shipments during January, 1941, came to 58,971 tons, of which 21,015 tons were estate rubber and 37,956 tons, native rubber.

The exports of native rubber from Netherland India to Singapore for remilling have been falling off considerably for some time, and a further decrease in these shipments is due since three large new Chinese-owned remilling factories were established in Sumatra in 1940. It appears that one of the factories is also to manufacture bicycle tires for the local market.

Government reports indicate that in 1939, 88,000 acres were replanted on estates in all Netherland India; in 1940, the area replanted totaled 50,000 acres.

CUBA

Rubber goods are to be manufactured by two different concerns now being established in Cuba. The Companhia Hulera Euzcadi S.A. of Mexico will have its factory near Habana and expects to begin production within a few months. Automobile tires and tubes, rubber-soled shoes, and molded household goods are to be produced in collaboration with an American firm which will make available its industrial processes and supply technical assistance. The new concern expects to be able fully to supply local needs for a variety of rubber goods as well as the bulk of the tire and tube requirements so that imports will suffer. In 1939 imports of rubber goods into Cuba totaled $1,972,099, of which the United States supplied 94.6%.

A second factory is to be established at Matanzas with funds raised by popular subscription. American machinery has already arrived, and production—which at first will be limited to molded items including rubber-soled canvas footwear—may begin within a period of months.

"Goodrich Cord Conveyer Belt." The B. F. Goodrich Co., Akron, O. 12 pages. This booklet describes Goodrich cord conveyer belting—its construction, physical advantages, and service conditions for which it is particularly adapted. Methods of splicing are also discussed, and photographs show typical applications.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	Commodity	City and Country
558	Hot water bottles	Alexandria, Egypt
558	Nursing nipples, irrigation tubes, etc.	Alexandria, Egypt
608	Automobile batteries	Cairo, Egypt
646	Rubber balls, balloons, animals, etc.	Cairo, Egypt

Editor's Book Table

BOOK REVIEWS

"1940 A. S. T. M. Proceedings." Published by the American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. 6 by 9 inches, 1396 pages. Price, $8.50, paper; $9, cloth; $10, half-leather.

This volume covers the entire proceedings of the society's annual meeting held at Atlantic City, N. J., June 24 to 28, 1940, including the many important committee reports and appended material presented and the technical papers and discussions. The report of Committee D-11 on Rubber Products is appended with three proposed methods on resistance to accelerated light aging, calibration of light source for accelerating the deterioration of rubber, and tear resistance of vulcanized rubber. A paper on "The Standardization of Durometers" by Lewis Larrick is included, together with a discussion by E. G. Kimmich, A. W. Carpenter, and L. V. Cooper. Among the other committee reports are those dealing with electrical insulating materials, textile materials, and plastics.

"Modern Export Packing—1940." Trade Promotion Series No. 207. Joseph Leeming, Transportation Division, Bureau of Foreign and Domestic Commerce, United States Department of Commerce. 1940. Cloth, 5¾ by 9 inches, 530 pages. For sale by the Superintendent of Documents, Washington, D. C. Price $1.

Packing, the introduction of this book emphasizes, is one of the most fundamental factors to be considered in connection with the problem of extending and maintaining our important overseas markets. Replacing a previous work published in 1924, the present volume was prepared to provide an up-to-date comprehensive manual describing the basic principles of packing export merchandise. The three main sections deal with the construction of containers, packaging methods for specific commodity groups, and certain vital considerations affecting satisfactory packing.

Seven pages, devoted to packing methods for rubber goods, cover specifically: pneumatic tires and tubes, hose, belting, matting, heels, rubber cement, piece goods, scrap rubber, and toy balloons. The last section of the book states that transparent sheets made from rubber or latex derivatives, including rubber chloride and rubber hydrochloride, are of value in preventing rust, corrosion, or mildew during shipment. The use of latex and chlorinated rubber is also mentioned in connection with the waterproofing of paper bags; while latex is used as a moisture-proof closure for these bags.

An appendix, which further amplifies the usefulness of this work, presents a comprehensive picture of conditions and facilities at various world ports.

"Temperature—Its Measurement and Control in Science and Industry." Papers presented at a symposium held in New York, N. Y., November, 1939, under the auspices of the American Institute of Physics. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. 1941. Cloth, 6 by 9 inches, 1362 pages. Indexed. Price $11.

This volume, encyclopedic in scope, comprises 125 symposium papers which comprehensively cover all of the fundamentals of temperature measurement and control and also present details of many specialized applications of pyrometry. The papers have been grouped into 13 chapters, the titles of which indicate the broad coverage of the subject matter: "Temperature and Temperature Scales", "Precision Thermometry", "Education", "Natural Sciences", "Temperature in Biology", "Temperature and Its Regulation in Man", "Automatic Temperature Regulation and Recording", Special Applications and Methods", "General Engineering", "Metals and Ceramic Industries", "Oil Industries", "Optical and Radiation Pyrometry", and "Thermometric Metals and Alloys".

Development in pyrometry during the past two decades has measurably contributed to many phases of industrial progress. This is particularly true of the rubber industry, which has undergone many advances in processing dependent on precise

measurement and control of temperature. Thus, while no paper in this volume deals specifically with rubber processing problems, the basic information contained therein should be of interest and value to those in the industry engaged in any phase of temperature work.

"Trade-Names Index." Published by Special Libraries Association, 31 E. 10th St., New York, N. Y. 1941. Cloth, 7 by 10 inches, 178 pages. Price $4.

This volume contains an alphabetical list of 3,496 trade names, primarily concerned with materials, processes, and equipment having technical significance. The list, taken from the files of the Technology Department of the Carnegie Library of Pittsburgh, includes only a small part of the existing number of trade names, but this deficiency is partially compensated for by a supplement which presents a classified bibliography of sources for trade names, trade marks, and brand names. For each trade name listed, a definition is given, and usually a reference to a printed source of further information is cited. While some of the listings are concerned with rubber technology, this subject is not comprehensively covered.

NEW PUBLICATIONS

"Quadrafos (Sodium Tetraphosphate)." American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y. 28 pages. Quadrafos, the subject of this booklet, is sodium tetraphosphate in which the alkaline and acid ingredients are accurately balanced for high efficiency in industrial applications. For general industrial use Quadrafos is employed as a water conditioner; while specific applications cover a wide range of industries. A powerful deflocculating and dispersing agent, Quadrafos finds use in latex compounding.

"U. S. Rub Electrical Building Wires and Cables." United States Rubber Co., 1230 Sixth Ave., New York, N. Y. 52 pages. Specifications and data on the firm's complete line of Dilec building wires and cables are presented in this catalog, together with companion products such as fixture wire, and non-metallic sheathed, service entrance, and service drop cables. Insulation types specified include: code, moisture-resistant, performance, heat resistant, 90% unmilled grainless rubber (Laytex), and synthetic. Appended technical data enhance the catalog's usefulness.

"Second Report of the Board." The British Rubber Publicity Association, 19 Fenchurch St., London, E.C.3., England. 8 pages. This report briefly reviews the Association's activities during 1939 in respect to the following: rubber in agriculture, in the building industry, and in the home, educational propaganda, exhibitions, publications, propaganda abroad, administration, and war.

"Sharples Synthetic Organic Chemicals." The Sharples Solvents Corp., Philadelphia, Pa. 72 pages. The twelfth edition of this booklet presents the entire line of the firm's organic chemicals—commercial, semi-commercial, and laboratory types—with a description of important chemical and physical properties and suggested uses. The commercial products include: alcohols, amines and their derivatives, alkyl-aryl hydrocarbons, chlorine compounds, esters, ethers, olefins, substituted phenols, and sulphur compounds.

"The Proteins of *Hevea Brasiliensis*." G. R. Tristram. Publication No. 2. The British Rubber Producers' Research Association, 19 Fenchurch St., London, E.C.3, England. 12 pages. In this investigation, the results of which were reprinted from *The Biochemical Journal*, a protein was isolated from dried *Hevea* latex and quantitatively analyzed for nine different amino acids: tyrosine, tryptophan, cystine, methionine, arginine, histidine, lysine, glutamic acid, and aspartic acid. The nine compounds, all present in the protein, were found to represent 47.4% of the total nitrogen content of the protein. According to the study, the protein is in many respects similar to those found in leaves of other types of plants.

"Industrial Chemicals." American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y. 48 pages. The firm's chemicals and allied products are listed alphabetically and according to industrial use in this reference booklet. A data section gives concise information on many of the listed products, including rubber compounding materials.

"B. F. Goodrich Products, 1870-1941." The B. F. Goodrich Co., Akron, O. 24 pages. This booklet highlights many past Goodrich accomplishments and recent ones such as Ameripol and Duramin and describes a number of the many products the firm makes for national defense, industry, the farm, the automobile, the airplane, etc.

"Laboratory Instruments—Chemical & Biological." Catalog XN 41. American Instrument Co., Silver Spring, Md. 184 pages. This catalog presents detailed descriptive information on many of the firm's scientific instruments for a wide variety of purposes. While a number of the instruments of a general nature are also applicable to rubber laboratory work, certain products described in the booklet are of particular interest to workers in this field, e.g., rubber oscillograph, pH meters, laboratory hydraulic presses, X-ray equipment, particle size analyzer, accelerated aging apparatus, and electrodialysis cells. A number of other instruments produced by the firm solely for the physical testing of rubber will be presented in a later catalog.

"Custom House Guide." 1941 Edition. Published by Custom House Guide, Box 7, Station P., Custom House, New York, N. Y. Price $15. This guide, now in its seventy-ninth year, presents detailed information for all those engaged in foreign commerce. A supplementary monthly service keeps the annual publication revised to date.

"Building America—Rubber." Published for The Society for Curriculum Study and distributed by Americana Corp., 2 W. 45th St., New York, N. Y. 32 pages. Price 30¢. This issue, one of a series of illustrated studies of modern American problems, dramatically depicts the story of rubber, chiefly as it relates to our national economy. The history of the production and manufacture of rubber is outlined with emphasis placed upon sources of raw material supply. In this connection the problems of Western Hemisphere sources—natural and synthetic—are discussed, together with the possibilities of conservation through the use of reclaim. Much is said also about our rubber needs for both civilian and defense purposes.

"Hepteen Base Accelerator." Report No. 4012-3. Naugatuck Chemical Division of United States Rubber Co., 1230 Sixth Ave., New York, N. Y. 12 pages. The properties and applications of Hepteen Base accelerator, a reaction product of heptaldehyde and aniline, are briefly reviewed in this report. Principal uses cited are: inner tubes, molded sundries and toys, white sidewalls, hard rubber, high reclaim molded products and jar rings. Formulations and test data are given for the following types of stock: pure gum, inner tube, leatherette, and white sidewalls. Hepteen, also mentioned, is a diluted form of Hepteen Base with exactly one-fifth the accelerating strength of the latter.

"Compounding Manual for Hycar O. R.—An Oil Resistant Type of Synthetic Rubber." Vol. I. Hydrocarbon Chemical & Rubber Co., Akron, O. 24 pages. Said to contain data never before revealed, this compounding manual discusses the following subjects in relation to Hycar O.R.: properties, uses, sulphur and accelerators, pigments, softeners and waxes, antioxidants, mixtures with natural rubber and other synthetics, processing (mastication, compounding, calendering, lamination, tubing, molding, and curing), and adhesion to metal. General formulas for printers' roller compounds, oil resistant automobile parts, a type of motor support, gasoline hose tube, light colored all-purpose stock, cheap molding compound, belt cover compound, and soling compound are given with results on physical properties and the volume change after immersion in various solvents. Other data show the effect of different types of softeners and carbon blacks.

RUBBER BIBLIOGRAPHY

Electrocoating. J. O. Amstuz, *Rubber Age (N. Y.)*, Apr., 1941, pp. 19-21.

Petroleum in Rubber. J. B. Tuttle, *Rubber Age (N. Y.)*, Apr., 1941, pp. 23-27.

X-Ray Studies of Rubber. II. G. L. Clark, *Rubber Age (N. Y.)*, Apr., 1941, p. 28-30.

Use of Rubber by the United States Navy. A. N. Wecksler, *Rubber Age (N. Y.)*, Apr., 1941, pp. 31-33.

An X-Ray Study of the Proportion of Crystalline and Amorphous Components in Stretched Rubber. J. E. Field, *J. Applied Phys.*, Jan., 1941, pp. 23-34.

Infra-Red Spectra of Rubber and High Polymers. W. C. Sears, *J. Applied Phys.*, Jan., 1941, pp. 35-40.

Some Applications of the Kinetic Theory to the Behavior of Long Chain Compounds. H. Mark, *J. Applied Phys.*, Jan., 1941, pp. 41-44.

Physical Characteristics of Synthetic Rubbers. J. N. Street and J. H. Dillon, *J. Applied Phys.*, Jan., 1941, pp. 45-54.

Native Rubber Report for First Half-Year 1940. *Bull. Rubber Growers' Assoc.*, Jan.-Feb., 1941, pp. 6-15.

An Improved Electrodialyzer. F. E. Brauns, *Ind. Eng. Chem. (Anal. Ed.)*, Apr. 15, 1941, p. 259.

Petroleum. M. B. Hopkins, *Chem. Industries*, Apr., 1941, pp. 438-39.

Detecting Faults While Laying Buried Telephone Wire. J. B. Hays, *Bell Labs. Record*, Apr., 1941, pp. 241-44.

Latin America as a Source of Strategic Materials. H. P. Macgowan, *Bull. Pan American Union*, Feb., 1941, pp. 94-108.

Investigation of the Fine Structure of High-Molecular Substances with the Universal Electron Microscope. M. Von Ardenne and D. Beischer, *Rubber Chem. Tech.*, Jan., 1941, pp. 15-26.

Use of Synthetic Rubber in the Automotive Industry from the Viewpoint of the Rubber Technologist. J. N. Street and H. L. Ebert, *Rubber Chem. Tech.*, Jan., 1941, pp. 211-20.

Transparent Rubber Compounds. W. F. Bixby and H. I. Cramer, *Rubber Chem. Tech.*, Jan., 1941, pp. 221-26.

Distribution of Non-Rubber Substances in Preserved Latex. H. C. Baker, *Trans. Inst. Rubber Ind.*, Dec., 1940, pp. 165-83.

Executives for Tomorrow. L. K. Firestone, *Executives Service Bull.*, Mar., 1941, pp. 7-8.

Flexible Plastics Enter the Apparel Field. H. S. Bunn, *Bakelite Rev.*, Apr., 1941, pp. 12-13, 20.

Rubber on the Rebound—East to West. E. W. Brandes, *Agriculture in the Americas*, Apr., 1941, pp. 1-11.

Some Notes on the Characteristics of "Thiokol." T. G. Crane, *India-Rubber J.*, Mar. 8, 1941, pp. 3-4. (To be continued.)

Estimation of Carbon Black in Neoprene Compounds. J. R. Scott and W. H. Willott, *India-Rubber J.*, Mar. 8, 1941, p. 9.

Salesmanship and the Rubber Industry. II. *India-Rubber J.*, Mar. 8, 1941, pp. 10-11. III. Mar. 29, pp. 6-7.

Test Formulas for Reclaimed Rubber. H. F. Palmer and R. H. Crossley, *Ind. Eng. Chem. (Anal. Ed.)*, Mar. 15, 1941, pp. 154-56.

New Instrument for Rheological Studies of Plastic Substances. C. R. Bailey, *Ind. Eng. Chem. (Anal. Ed.)*, Mar. 15, 1941, pp. 173-77.

Measurement of Flow Properties with the Gardner Mobilometer. P. W. Kinney, *Ind. Eng. Chem. (Anal. Ed.)*, Mar. 15, 1941, pp. 178-85.

Machine and Methods for Testing Mechanical Stability of Latex. C. K. Novotny and W. F. Jordan, *Ind. Eng. Chem. (Anal. Ed.)*, Mar. 15, 1941, pp. 189-91.

An Improved Thixotrometer. R. W. Kewosh, *Ind. Eng. Chem. (Anal. Ed.)*, Mar. 15, 1941, p. 195.

Physics in the Manufacture and Use of Rubber. J. W. Schade, *J. Applied Phys.*, Jan., 1941, pp. 2-11.

Thermal Problems in Rubber Manufacture. S. H. Hahn, *J. Applied Phys.*, Jan., 1941, pp. 12-20.

Dielectric Constant and Power Factor of Certain Kinds of Koroseal at Radio-Frequencies. O. F. Fouts, *J. Applied Phys.*, Jan., 1941, pp. 21-22.

Relation between Molecular Weights and Physical Properties of Rubber Fractions. G. Gee and L. R. G. Treloar, *Trans. Inst. Rubber Ind.*, Dec., 1940, pp. 184-210.

(*Continued on page* 86)

Patents and Trade Marks

APPLICATION

United States

21,762. (Reissue.) **Adhesive Sheeting.** R. G. Drew, assignor to Minnesota Mining & Mfg. Co., both of St. Paul, Minn.
2,234,238. **Lubricating Fitting** for Bearing with Rubber Seal. S. H. Forsberg, assignor to Deere & Co., both of Moline, Ill.
2,234,258. **Wringer.** W. L. Kauffman, II, assignor to Lovell Mfg. Co., both of Erie, Pa.
2,234,350. **Hose and Coupling Structure** with Smooth Internal Bore. J. A. Muller, Paterson, N. J., assignor to United States Rubber Co., New York, N. Y.
2,234,390. **Cushioned Shoe Heel Construction.** J. P. Taylor, Los Angeles, Calif.
2,234,403. **Pneumatic Tire Boot or Liner.** E. C. Goodrich, Los Angeles, Calif.
2,234,435. **Conducting Cable.** F. H. Johnson, Ferndale, Mich.
2,234,441. **Insulating Grommet.** G. C. Ludwig, Detroit, Mich.
2,234,443. **Clutch** with Rubber Annulus. C. Macbeth, Birmingham, England.
2,234,494. **Vaginal Diaphragm.** W. V. Lay, Denver, Colo.
2,234,495. **Pessary.** W. V. Lay, Denver, Colo.
2,234,506. **Sponge Rubber Lay Pillow.** M. E. Sistig, Denver, Colo.
2,234,507. **Low Pressure Tire Alarm.** H. H. Thompson, Santa Cruz, Calif.
2,234,512. **Spray Holder for Caskets.** L. E. Wilson, Eagle Grove, Iowa.
2,234,524. **Churn Support** with Rubber Ring Parts. F. L. Fulwider, Anamosa, Iowa.
2,234,542. **Renewable Rubber Heel.** J. F. Anderson, Chicago, Ill.
2,234,545. **Two-Step Process of Making Vulcanized Modified Fatty Oils** Which Comprises Heating in the Presence of a Polar Compound and Then Vulcanizing with Sulphur. L. Auer, Jackson Heights, N. Y., assignor to J. R. Newman, Washington, D. C., as trustee.
2,234,558. **Dispenser and Sponge Rubber Applicator.** T. Huston, Hartford, Conn.
2,234,597. **Loom Shuttle Check** with Flexible Rubber Tube. E. R. Holmes, assignor to Crompton & Knowles Loom Works, both of Worcester, Mass.
2,234,625. **Oil Seal** of Rubber and Oil-Resistant Synthetic Rubber. L. H. Diehl, G. T. Balfe, and H. B. Denman, assignors to Detroit Gasket & Mfg. Co., all of Detroit, Mich.
2,234,672. **Protective Composition** of Water Glass, Water, Formaldehyde, and Latex Dispersion. C. R. Gleason, Chicago, Ill., assignor to Insolna Corp., New Orleans, La.
2,234,673. **Container Structure.** P. S. Grierson, Millburn, assignor to Thomas A. Edison, Inc., West Orange, both in N. J.
2,234,675. **Armored Cable.** G. A. Johnson, Irvington, N. J.
2,234,688. **Distributor Head and Conductor** for Internal Combustion Engines. J. A. Burckhalter, Barnwell, S. C.
2,234,709. **Windshield Wiper.** R. J. Rodrick, Akron, O.
2,234,729. **Pince-Nez Eyeglasses** with Rubber Cups. J. L. Montalvo-Guenard, Ponce, Puerto Rico.
2,234,745. **Electric Connecting Device.** A. von Rarrel, Hamburg, N. Y.
2,234,823. **Non-Skid Tire Tread** Having a Recess with Outwardly Converging Sides and a Metallic Channel-Shaped Insert Secured to the Base of the Recess. F. B. Hewel, Pittsburgh, Pa.
2,234,838. **Emergency Safety Vehicle Wheel.** A. Briskman, assignor of 50% to A. H. Briskman, both of Baltimore, Md.
2,234,884. **Basting Device** with Rubber Bulb. F. M. Teel, Hazleton, Pa.
2,234,887. **Renewable Rubber Heel.** J. F. Anderson, Chicago, Ill.
2,234,927. **Link for Endless Traction Belts** Comprising a Rubber Body and Metallic Insert Therein. L. M. Kubaugh, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,234,972. **Flashlight** with Rubber Housing. W. M. Lennan, Pasadena, Calif.
2,235,020. **Electrical Connector.** D. C. Jones, San Francisco, Calif.
2,235,030. **Sphygmomanometer Cuff, Etc.** H. L. Mason and K. H. Hubbard, assignors to Taylor Instrument Cos., all of Rochester, N. Y.
2,235,052. **Fuel Pump** for Internal Combustion Engines with Rubber Screw. P. W. Trier, Detroit, Mich., assignor to Briggs & Stratton Corp., Milwaukee, Wis.
2,235,069. **Steering Wheel Switch.** H. D. Geyer, Dayton, O., assignor to General Motors Corp., Detroit, Mich.
2,235,121. **Engine Starter Drive** with Elastic Annulus. Y. Sekella, Elmira, N. Y., assignor, by mesne assignments, to Bendix Aviation Corp., South Bend, Ind.
2,235,184. **Therapeutic Vibrator.** W. L. Wettlaufer, Buffalo, N. Y.
2,235,218. **Diffusion Apparatus.** A. C. Koenig, Cuyahoga Falls, O., assignor to Firestone Tire & Rubber Co., Akron, both in O.
2,235,293. **Bassinette** with Elastic Attachments. T. J. Mellon, Kansas City, Mo.
2,235,313. **Gripping Device.** C. E. Cleveland, Reading, Vt.
2,235,318. **Apparatus to Cement Wells.** E. P. Halliburton, Los Angeles, Calif., assignor to Halliburton Oil Well Cementing Co., Duncan, Okla.
2,235,351. **Sealing Device.** S. F. Baker, assignor to Thornton Tandem Co., both of Detroit, Mich.
2,235,372. **Receiver Headband** with Resilient Ear Pads. O. Kalbitz, Finkenkrug, assignor to Siemens Apparate and Maschinen Gesellschaft mit beschränkter Haftung, Berlin, both in Germany.
2,235,375. **Pneumatic Tire** with Laterally Extending Rib Member Adjacent the Tread. H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.
2,235,378. **Tire and Wheel Combination** with Yieldable Tension Spokes and Rubber Tread. J. V. Martin, Garden City, N. Y.
2,235,430. **Starting Pinion** with Rubber Cushion. S. Jencick, Chagrin Falls, O.
2,235,438. **Lubricated Packing** Containing Kapok, Calcium Stearate, Fibrous Talc, and Rubber. G. P. Leistensnider, West Englewood, N. J., assignor to Metalastic Mfg. Corp., a corporation of N. J.
2,235,453. **Bottle Cap.** E. Kirmes, London, England.
2,235,492. **Cooky Molding Machine** with Rubber Roller. E. A. Weidenmiller, Chicago, Ill.
2,235,493. **Windshield Wiper.** O. Dobkin, Akron, O.
2,235,505. **Resilient Microphone Support.** B. F. Ryan, Los Angeles, Calif., assignor to Warner Bros. Pictures, Inc., a corporation of Del.
2,235,523. **Electric Cord.** C. O. Hull, Stratford, Conn., assignor to General Electric Co., a corporation of N. Y.
2,235,536. **Ozone-Resistant Electrical Cable Insulation** Containing Rubber, Polymerized Isoolefin, and Factice. M. H. Savage, Bridgeport, and L. H. Hitchcock, Milford, both in Conn., assignor to General Electric Co., a corporation of N. Y.
2,235,581. **Broom** with Rubber Cleaning Element. T. I. King, Menlo Park, Calif.
2,235,585. **Safety Device** for Blasting Cables. T. C. Luke and A. Mariotti, McComas, W. Va., assignors of one-fourth to C. Mariotti.
2,235,598. **Play Pen and Walking Device** with Rubber Ring Top. G. B. Wisecarver, Columbus, O.
2,235,605. **Screw Propeller** with Resilient Bushing. E. Bugatti, Molsheim, France.
2,235,608. **Valve** with Soft Rubber Gasket. L. G. Daniels, Rockford, Ill.
2,235,619. **Mechanical Poultry Picker** with Rubber Fingers. E. C. McMahan and A. Charlebois, Los Angeles, Calif.
2,235,756. **Truss.** J. M. Bass, Lufkin, Tex.
2,235,841. **Elastic Handle** for Safety Razors. G. Monnet, New York, N. Y.
2,235,848 and 2,235,849. **Man's Undergarment.** A. M. Reis, assignor to Robert Reis & Co., both of New York, N. Y.
2,235,867. **Pneumatic Tire** with a Growth-Resisting Carcass Containing Rayon Yarns. M. Castricum, Grosse Pointe, and F. C. Kennedy, Detroit, both in Mich., assignors to United States Rubber Co., New York, N. Y.
2,235,897. **Lubricator** with Dilatable Elastic Member. G. L. Moore, Chicago, Ill.
2,235,937. **Rubber and Cement Tank Lining.** A. C. Linberg, Newton Center, assignor to National Gunite Contracting Co., Boston, both in Mass.
2,235,946. **Atomizer.** A. F. Reilly, North Attleboro, Mass., assignor to Evans Case Co., a Corporation of Mass.
2,235,976. **Mechanical Connection** with Resilient Member. F. C. Best, assignor to Packard Motor Car Co., both of Detroit, Mich.
2,236,005. **Apparatus, Having Rubber-Covered Rolls,** for Coating Both Sides of a Web of Paper. P. J. Massey, River Forest, Ill.
2,236,026. **Door Closure Control Assembly.** L. L. Westcamp, Elk Creek, Calif.
2,236,054. **Wheel Structure and Tire.** B. Di Curzio, Detroit, Mich.
2,236,178. **Bobbin and Spindle** for Spinning, Twisting, and Similar Machines with Resilient Bushing. J. A. Kennedy, Saco, Me., assignor to Saco-Lowell Shops, Boston, Mass.
2,236,194. **Finger Cushion Pencil Holder.** C. Lorber, Louisville, Ky.
2,236,200. **Seal Bearing** with Resilient Plug. H. L. Potter, assignor to Fafnir Bearing Co., both of New Britain, Conn.
2,236,278. **Anti-Skid Footwear Tread** of Ribbed Design. N. E. Tousley, Waban, Mass., assignor to B. F. Goodrich Co., New York, N. Y.
2,236,293. **Controlling Device** for the Ends of Discharge Pipes with Elastic Valve Device. J. K. Lund, Oak Park, assignor to Dole Valve Co., Chicago, both in Ill.
2,236,306. **Hollow Articles** in a Collapsible Mold. K. Bratring, Berlin, Germany assignor to Neocell Products Corp.
2,236,319. **Clothes Wringer.** T. J. Litle, Jr., assignor to Easy Washing Machine Corp., both of Syracuse, N. Y.
2,236,392. **Concrete Compacting Tool** with Elastic Expansible Member. J. F. Barry, Brooklyn, N. Y., and J. J. Harley, Tenafly, and W. S. Hayford, Morristown, both in N. J., assignors to Bell Telephone Laboratories, Inc., New York, N. Y.
2,236,408. **Resilient Mounting** for Driving Unit in Automobiles. M. Klavik, Prague, Czechoslovakia.
2,236,410. **Vehicle Rear End Suspension** with Rubber Bearing. J. W. Leighton, Port Huron, Mich.
2,236,412. **Automobile Ventilating Device** with Resilient Seal. W. L. Morrison, Lake Forest, Ill.
2,236,414. **Athletic Implement Shaft** Reenforced with Resilient Material. M. B. Reach, Springfield, Mass.
2,236,508. **Spreadable Brake Body** Particularly Adapted for Bicycle Hubs. A. Lesage, Schweinfurt, Germany.
2,236,527. **Flexible Adhesive Sheet** Utilizing a Blend of Broken-Down Rubber, Water-Insoluble Solid Resin, and Reenforcing Pigment. R. G. Drew, assignor to Minnesota Mining & Mfg. Co., both of St. Paul, Minn.
2,236,560. **Ball Check for Bowling Alleys** Comprising Pair of Rubber Rings. J. E. Bancroft, Jamaica, assignor to American Bowling & Billiard Corp., New York, both in N. Y.

Dominion of Canada

395,068. **Recapped Tire.** J. C. Heintz, Lakewood, O., U. S. A.
395,084. **Shaving Brush Fountain Device.** A. Penner, Abbotsford, B. C.
395,187. **Vibration Absorbing Mechanism.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of S. E. Woodbury, Beverly, Mass., U. S. A.
395,231. **Nursing Nipple and Valve.** A. D. Ingram and E. J. Everest, co-inventors, both of London, England.
395,308. **Toy Airplane** with Elastic Motor. Emmert-Hammes & Co., Warren, assignee of J. L. Hunt, Grosse Pointe Park, both in Mich., U. S. A.
395,362. **Receptable Cap** with Rubber Sleeve Gasket. White Cap Co., Chicago, assignee of W. P. White, Glencoe, both in Ill., U. S. A.
395,387. **Thermoplastic Shoe Box Toe.** H. Shrager and B. Shinberg, co-inventors, both of Lawrence, Mass., U. S. A.
395,419. **Collapsible Tube Cap.** H. J. Scheringer, Olive Bridge, N. Y., U. S. A.
395,429. **Vehicle Splash Guard.** G. H. Wilson, Kurting, Victoria, Australia.
395,443. **Cap and Package** with Resilient Gasket. Anchor Cap & Closure Corp., Long Island City, assignee of A. Podel, New York, both in N. Y., U. S. A.
395,541. **Adjustable Shoe Elevator** with Rubber Cushion Layer. J. Burger, New York, N. Y., U. S. A.
395,564. **Bed Pan Cushion** with Elastic Retaining Means. A. Rainboth, Montreal, P. Q.
395,591. **Pad** with Latex-Coated Backing, and Padded Spring-Cushion. Burton-Dixie Corp., assignee of E. Havemann, both of Chicago, Ill., U. S. A.
395,605. **Fountain Pen.** Chilton Pen Co., Inc., Summit, assignee of M. G. Sypher, Jersey City, both in N. J., U. S. A.
395,623. **Pattern Fabric** Utilizing Rubber-Coated Yarn. Heberlein Patent Corp., New York, N. Y., U. S. A., assignee of G. Heberlein and E. Weiss, co-inventors, both of Wattwill, Switzerland.

United Kingdom

532,597. **Electric Insulators.** T. B. Andre Rubber Co., Ltd., (H. Bough).
533,052. **Tires.** F. A. Millican.
533,096. **Aircraft Brakes.** Dunlop Rubber Co., Ltd., G. E. Beharrell, J. Wright, and H. Trevaskis.
533,108. **Washers or Valves** for Taps or Cocks. W. A. Meeson.
533,116. **Diaphragm Valves.** Saunders Valve Co., Ltd., and P. K. Saunders.
533,190. **Resilient Suspensions** for Aircraft, Etc. Soc. Italiana Pirelli.
533,196. **Insulated Electric Conductors.** Philips Lamps, Ltd.
533,492. **Breast Pumps.** M. Brown.
533,520. **Electric Insulators.** Pirelli-General Cable Works, Ltd., and H. Barron.
533,526. **Gland Packings** for Hydraulic Shock Absorbers. N. B. Newton.
533,581. **Flexible Tubing.** R. H. Archbald.
533,606. **Windscreen Wipers.** W. Reed-Lethbridge.
533,630. **Adhesive Compositions.** United States Rubber Co.

533,673. **Airscrew Deicers.** Pobjoy Airmotors & Aircraft, Ltd., and C. O. Towler.

533,827. **Corset Belts.** M. Smiley.

533,871. **Inflatable Life-Saving Jacket.** F. A. Tonnessen.

533,891. **Windscreen Wiper.** Soc. Anon. A. Citroen.

533,982. **Cables.** Telegraph Construction & Maintenance Co., Ltd., and E. W. Smith.

534,053. **Insulated Electric Conductors.** Philips Lamps, Ltd.

534,087. **Windscreen Cleaner.** Dunlop Rubber Co., Ltd., G. E. Beharrell, J. Wright, and H. Trevaskis.

534,101. **Inner Tube.** United States Rubber Co.

534,136. **Cushion Tires and Wheels Thereof.** Dunlop Rubber Co., Ltd.

534,263. **Rubber Tubes.** South Metropolitan Gas Co. and A. J. Prestage.

534,266. **Resilient Pipe Joints.** C. L. Cowdrey.

Germany

701,265. **Window Channeling.** F. Huttinger. Munich.

702,382. **Tire.** E. Muller. Berlin-Neukolln.

703,027. **Furniture with Inflatable Rubber Upholstery.** A. Schobel. Berlin-Lichtenberg.

PROCESS

United States

2,234,611. **Making a Composite Product** by Chlorinating the Surface of Rubber and Adhering Plasticized Gamma Polyvinyl Chloride Directly Thereto. H. L. Trumbull, Hudson, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,234,621. **Bonding Polyvinyl Chloride to Metal** by Coating Metal with Chlorinated Rubber Cement and Then Superposing at least One Coat of Polyvinyl Chloride Solution. S. L. Brous, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,234,839. **Contoured Vehicle Floor Mats.** G. N. Edwards, assignor to Ohio Rubber Co., both of Willoughby, O.

2,234,842. **Producing a Perforate Rubber Film or Sheet** by Applying a Latex Composition on an Air Impermeable Deposition Backing Having Cavities or Pits in the Deposition Surface so as to Entrap Air between the Latex Coating and the Backing in the Cavities or Pits, and Reducing the Pressure on the Exposed Surface of the Latex Coating to Cause the Entrapped Air to Expand and Force Its Way through the Latex Coating and Concurrently Drying or Gelling. H. F. Jordan, Nutley, N. J., assignor to United States Rubber Co., New York, N. Y.

2,235,148. **Rubber Printing Plates** Comprising Hard Rubber, Soft Rubber, Fabric, and Lead. R. D. Gartrell, Oakland, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,235,682. **Elastic Ply Fabric.** (Latex.) T. G. Hawley, Jr., Naugatuck, Conn., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,235,690. **Laminated Elastic Fabric** with Extensible and Non-Extensible Areas. M. C. Teague, Ridgewood, N. J., and T. G. Hawley, Jr., Naugatuck, Conn., assignors, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,235,694. **Footwear Construction.** F. H. Wolfhard, St. Jerome, and L. C. Woodall, Montreal, both in P. Q., Canada, assignors to United States Rubber Co., New York, N. Y.

2,235,981. **Rubber Laundry Bags.** E. M. Coe, Passaic, and N. H. Curtiss, Clifton, both in N. J., assignors, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,236,171. **Integral Multiple-Channel Rubber Hose.** C. D. Garretson, assignor to Electric Hose and Rubber Co., both of Wilmington, Del.

2,236,214. **Uniting Rubber Sheets** Utilizing a Plurality of Opposed Calender Rolls. J. R. Jones, assignor of one-fifth to C. M. Cable, both of Lima, O.

2,237,182. **Mounting an Inflatable Sponge Rubber Filler** within a Tire Casing. A. N. Iknayan, Indianapolis, Ind., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,237,315. **Insulating Wire** with a Composition of Vinylidene Chloride Which Produces an Insulated Coating Characterized by Uniformity, Flexibility, Abrasion Resistance, Water Impermeability, Non-inflammability, High Dielectric Strength, Low Power Factor, and Softening Point about 170° C. J. H. Reilly, assignor to Dow Chemical Co., both of Midland, Mich.

2,237,819. **Producing a Tire Casing** by Including the Step of Curing the Tread While Holding the Casing in a Laterally Expanded Circumferentially and Radially Contracted Condition, Wherein the Radial Measurement at All Points Will Approximately Equal the Expected Rolling Radius of the Tire. P. E. Hawkinson, Minneapolis, Minn.

2,237,835. **Footwear.** L. H. L'Hollier, Waltham, and F. F. Olson, Belmont, assignors to Hood Rubber Co., Inc., Watertown, all in Mass.

United Kingdom

533,090. **Repair of Rubber Mudwings** for Vehicles. Dunlop Rubber Co., Ltd., R. E. Williams, and E. W. Madge.

533,101. **Inner Tubes.** Firestone Tire & Rubber Co., Ltd.

533,105. **Elastic Knitted Fabrics.** I. & R. Morley, Ltd., and L. Dickerson.

533,777. **Rubber Thread.** T. L. Shepherd.

533,769. **Separation and Recovery** of Rubber and Fiber Constituents of Unvulcanized Rubber Scrap Containing Fibrous Material Incorporated Therein. Soc. Italiana Pirelli.

534,098. **Sponge Rubber Articles.** International Latex Processes, Ltd., and H. Kendrick.

534,211. **Golf Balls, Etc.** A. H. Stevens, (Sibley-Pym Corp.).

534,257. **Shoes.** United States Rubber Co.

Germany

701,510. **Method of Uniting Several Rubber Plates** Forming a Matrix on a Press for Shaping Sheeted Material. Continental Gummi-Werke, A.G., Hannover.

702,867. **Coating Tearable Strips of Material** with a Thermoplastic Wax-Rubber Mix. Marathon Paper Mills Co., Rothschild, Wis., U. S. A. Represented by K. T. Hegel and K. Schwarzhans, both of Berlin.

MACHINERY

United States

2,234,911. **Sequence Controller.** R. C. Davis, Akron, and C. W. Graham, Parma, assignors to Firestone Tire & Rubber Co., Akron, all in O.

2,235,292. **Matrix and Pressure Plate Attachment** for Tire Molds. E. A. Glynn, assignor to Super Mold Corp. of Calif., both of Lodi, Calif.

2,235,445. **Dipping Machine** Comprising Pedestal, Hydraulic Lift with Horizontal Member Mounted Thereon, a Form Support Rotatably Mounted on the Horizontal Member, Means for Rotating the Form Support, and Control Means. C. L. Beal, Cuyahoga Falls, assignor to American Anode, Inc., Akron, both in O.

2,235,688. **Apparatus and Method for Making Electrical Cables,** Including an Insulating Head and Die for a Pair of Conductors. C. W. Short, East Providence, R. I., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,235,960. **Cutter** for Stamping Flexible Materials. G. W. Curtis, Naugatuck, Conn., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,237,161. **Shoe Repair Press.** I. H. Rennie, West Medford, and H. A. Williams, Wakefield, Mass., assignors to B. F. Goodrich Co., New York, N. Y.

2,237,178. **Belt Making Apparatus.** W. B. Freeman, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,237,449. **Clicking Machine.** G. F. Ryan, Peabody, Mass., assignor to United Shoe Machinery Corp., Borough of Flemington, N. J.

2,237,582. **Apparatus for Marking Rubber Articles.** E. S. Smith, Ravenna, O.

Dominion of Canada

394,665. **Cord Stretching Apparatus** with Tapered Rolls. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of L. M. Cotchett, Hingham, Mass., U. S. A.

395,115. **Cable Impregnating Apparatus.** Calenders Cable & Construction Co., Ltd., assignee of R. S. Vincent, both of London, England.

395,265. **Used Tire Vulcanizers.** L. Steiner, Richmond, Surrey, England.

395,474. **Extrusion Press Ram.** Forging & Casting Corp., Ferndale, assignee of C. W. Krause, Detroit, both in Mich., U. S. A.

395,527. **Dipped Rubber Article Making Apparatus.** Frank B. Killian & Co., a partnership, assignee of J. R. Gammeter, assignee of B. G. Kuhne, all of Akron, O., U. S. A.

United Kingdom

532,959. **Vulcanizing Apparatus and Methods.** Firestone Tire & Rubber Co., Ltd.

533,157. **Vulcanizing Molds.** Firestone Tire & Rubber Co., Ltd.

533,412. **Apparatus for Molding Artificial Sponges.** Sponcel, Ltd.

533,413. **Apparatus for Manufacturing Artificial Sponges.** Sponcel, Ltd.

533,662. **Vulcanizers.** E. Lake, Ltd., and E. E. Parker.

533,816. **Vulcanizing Machines** for Repairing Tires, Etc. L. Steiner.

534,089. **Hydraulic Presses.** W. Ernst.

534,182. **Cord Stretcher and Winder.** United States Rubber Co.

Germany

702,435. **Tire Cutter and Roughener.** Firma Anton Bauschnagel, Karlsruhe, Baden.

702,586. **Sectional Mold for Endless V-Belts.** C. Devantier, Palma de Mallorca, Spain. Represented by Clemens A. Voigt, Berlin.

702,744. **Dipping Mold** for Seamless Goods with Reenforced Edges, from Rubber Dispersions. International Latex Corp., Rochester, N. Y., U. S. A. Represented by K. Lengner and H. Kosel, both of Berlin.

702,745. **Hand Tool for Grooving Tires.** A. Streich, Berlin.

702,746. **Extruder** for Thermoplastic Materials. Franz Braun A.G., Zerbst.

702,858. **Mold** for Assembling and Vulcanizing V-Belts. G. Pretzel, Essen.

703,422. **Stand for Rubber Gloves.** Ewald Witte & Co., Velbert, Rheinl.

703,537. **Stand for Rubber Parts,** especially Bathing Caps, Gas Masks, etc. Ewald Witte & Co., Velbert, Rheinl.

CHEMICAL

United States

2,234,202. **Vulcanizing Rubber** by Heating in the Absence of Sulphur with a Quinone Having No Substituents in the Aromatic Nucleus Other Than Hydrocarbon Groups. D. Spence, Monterey, Calif., assignor to B. F. Goodrich Co., New York, N. Y.

2,234,203. **Composition Comprising a Heat-Curable Plastic Polymer** of

$$CH_2{=}\underset{X}{\underset{|}{C}}{-}\underset{R}{\underset{|}{C}}{=}CH_3$$

Where X Is Halogen and R Is Hydrogen or a Hydrocarbon Radical Having in Chemical Combination Therewith an Unpolymerizable Acid-Stable, Organic Modifying Agent and also Comprising a Small Amount of a Hydrocarbon Substituted Ammonium Salt. H. W. Starkweather, New Castle County, and A. M. Collins, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, all in Del.

2,234,204. **Plastic Rubber-Like Materials** Made by Polymerizing, in the Presence of Sulphur,

$$CH_2{=}\overset{R_3}{\overset{|}{C}}{-}\overset{R_4}{\overset{|}{C}}{=}CH_2$$

Where R_3 and R_4 Are Hydrogen or Hydrocarbon Radicals, and Then Plasticizing by Adding $R{-}S{-}R_1$ Where R Is an Alkyl, Aryl, Thiazyl, Thiocarbamyl, Xanthogenyl, Thioxanthogenyl, Aromatic Aryl, or Aromatic Thioacyl Group, and R_1 Is Hydrogen, a Base-Forming Radical, or a Radical Represented by $-S_n-R_2$ Where n Is a Whole Number and R_2 Is One of the Groups Represented by R above. H. W. Starkweather, New Castle County, and M. A. Youker, Gordon Heights, assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, all in Del.

2,234,211. **Composition Comprising a Heat Curable Plastic Polymer** of

$$CH_2{=}\underset{X}{\underset{|}{C}}{-}\underset{R}{\underset{|}{C}}{=}CH_2$$

Where R Is Hydrogen or a Hydrocarbon Radical and X Is Halogen Having, in Chemical Combination Therewith, an Unpolymerizable, Acid-Stable Organic Modifying Agent and also Comprising a Small Amount of a Mercaptan. H. W. Walker, Woodstown, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,234,212. **Solution of Gamma Polyvinyl Chloride** in a Mixed Solvent Containing Chlorinated Benzene or One of Its Homologs and Furfuryl Alcohol, Furfural, Tetrahydrofurfuryl Alcohol, or Tetrahydrofurfural, in Such Proportions That the Gel Point Is Lower Than the Gel Points Obtained with Either Solvent Alone. R. F. Wolf, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,234,215. **Making Plastic, Rubber-Like Materials** by Polymerizing Chloro-2-Butadiene-1, 3 in the Presence of Sulphur and Then Plasticizing the Polymerized Material by Adding at least One Compound of the General Formula $R{-}S{-}R_1$, Where R Is an Alkyl, Aryl, Thiazyl, Thiocarbamyl, Xanthogenyl, Thioxanthogenyl, Aromatic Acyl or Aromatic Thioacyl Radical, and R_1 Is a Hydrogen Base-Forming Radical or a Radical Represented by $-S_n-R_2$ in Which n is a Whole Number Less Than 4, and R_2 Is One of the Group Represented by R above. M. A. Youker, Gordon Heights, assignor to E. I. du Pont de Nemours & Co., Wilmington, both in Del.

2,234,317. **Coating Compositions** Made by Mixing Chlorinated Rubber and Organic Solvents with Sulphuretted p-Toluidine or Sulphuretted m-Xylidine. S. Pfeiffer, Riehen, assignor to J. R. Geigy A.G., Basel, both in Switzerland.

2,234,615. **Plasticizers** for Polyvinyl Halides—Esters and Ethers Containing a Tetrahydro-

furfuryl Group Attached Directly to the Determining Group. C. H. Alexander, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,234,743. **Vulcanizing Rubber** by Exposing It to Actinic Light of an Intensity at least Comparable to Direct Sunlight in the Absence of Sulphur and Sulphides and in the Presence of a Dehydrogenating Agent Having a Quinoid Structure Activated by Light. D. Spence, Monterey, Calif., assignor to B. F. Goodrich Co., New York, N. Y.

2,234,848. **Treating Rubber** by Incorporating in Rubber prior to Vulcanization a 2-Mercapto Alkyl-Substituted Dihydropyrimidine. W. P. ter Horst, Packanack Lake, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,235,149. **Preparing a Plastic Conversion Product** of a Mixed Polymer of a Conjugated 1,3 Diene with an Alpha-Beta-Unsaturated Nitrile by Heating a Mixture of the Polymer and an Organic Nitroso Compound (p-Nitroso-Dimethyl Aniline, Nitroso-Beta-Naphthol, or p-Nitroso-Diethyl Aniline). R. H. Gerke, Nutley, N. J., assignor to United States Rubber Co., New York, N. Y.

2,235,621. **Vulcanizable Composition**—Rubber and an Organic Polymer Containing Combined Sulphur Available for Vulcanization of the Rubber. J. C. Patrick, Morrisville, Pa., assignor to Thiokol Corp., Yardville, N. J.

2,235,625. **Softener** for Copolymers of Butadiene and Ring-Substituted Vinyl Compounds, Acrylonitriles, and Esters of Acrylic Acids, Which Comprises a Diazo Amino Aryl Compound (Added to Monomeric Mixture before Polymerization). W. D. Wolfe, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.

2,235,629. **Antioxidant**—Reaction Products of 1-Chloro 2-Naphthol and Aniline. A. M. Clifford, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.

2,235,782. **Soluble Copolymers of Vinyl Chloride and Vinylidene Chloride.** R. M. Wiley, assignor to Dow Chemical Co., both of Midland, Mich.

2,235,796. **Purification of Halogen-Containing Polymers.** E. C. Britton and F. L. Taylor, assignors to Dow Chemical Co., all of Midland, Mich.

2,235,971. **Organolite**—A Water-Insoluble Material Having Cation-Exchange Properties Resulting from Sulphonating a Plastic Reaction Product. T. L. Wilson, Cedar Grove, N. J., assignor to United States Rubber Co., New York, N. Y.

2,236,389. **Vulcanizing Agents** — Salts, Thiuram Sulphides, and Esters of Hexamethylene Dithiocarbamic Acid. I. Williams, Borger, Tex., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.

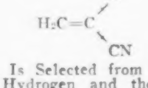
2,237,017. **Attaching Gelatin Layers** to a Support of Polymerized Vinyl Chloride by Means of an Intermediate Layer Comprising a Mixed Polymerizate of Vinyl Chloride and an Ester of Vinyl Alcohol or an Acrylic Acid Ester. K. Thinius, Eilenburg, Germany, assignor, by mesne assignments, to W. H. Duisberg, New York, N. Y.

2,237,024. **Paint** Comprising Thermoprene, Cashew Nut Shell Oil, and a Liquid Carrier Which Dries by Evaporation. R. A. Crawford, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,237,125. **Neutralization of Rubber Hydrochloride Cements and Products Made Therefrom and Process Pertaining Thereto,** the Neutralization Comprising Treatment with Solid Sodium Carbonate, Followed by Separation of Neutralization Products and Excess Sodium Carbonate. C. W. Walton, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.

2,237,769. **Vulcanizing Rubber** by Heating It and Sulphur in the Presence of a Benzothiazyl Thio Aryloxy-Acetate Mixed with a Guanidene Accelerator as an Activator. R. L. Sibley, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,238,020. **A Copolymer of from 5 to 95% of Vinylidene Chloride** and Correspondingly from 95% to 5% of a Compound Having the General Formula



Wherein R Is Selected from the Class Consisting of Hydrogen and the Lower Alkyl Radicals Containing from 1 to 5 Carbon Atoms Inclusive. A. W. Hanson and W. C. Goggin, assignors to Dow Chemical Co., all of Midland, Mich.

Dominion of Canada

395,223. **Isobutylene Polymer Production** Which Comprises Treating a Hydrocarbon Mixture Containing Olefins by Selectively Polymerizing the Isobutylene Present to Dimers and Trimers, Separating and Depolymerizing These Dimers and Trimers, and Repolymerizing the Purified Isobutylene with a Halide Catalyst at a Temperature below -20° C. Standard Oil Development Co., Linden, N. J., U. S. A., and I. G. Farbenindustrie A.G., Frankfurt a.M., Germany, each an assignee of one-half of the interest of H. G. Schneider, Roselle, N. J., U. S. A., and M. Otto, Oppau, Germany.

395,299. **Polyvinyl Acetal Resin Plasticized** to Give Flexible and Elastic Compositions with an Elongation of at least 200% and an Ultimate Strength above 2,000 Pounds per Square Inch. Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of H. F. Robertson, Coraopolis, Pa., U. S. A.

United Kingdom

532,942. **Butadiene Manufacturing Processes.** Instituto Per Lo Studio Della Gomma Sintetica and G. Natta.

533,142. **Preparation of Copolymers of Butadiene and Vinylidene Chloride.** Wingfoot Corp.

533,521. **Methods of Thickening Latex, and Thickened Latex Compositions Produced Thereby.** Firestone Tire & Rubber Co., Ltd.

533,669. **Conversion Products of Rubber.** United States Rubber Co.

533,838. **Preparing Rubber Latex.** A. Nyrop.

534,095. **Compounding Rubber.** Wingfoot Corp.

534,186. **Concentrating Aqueous Dispersions.** Algemeene Vereeninging Van Rubber-Planters Ter Oostkust Van Sumatra.

534,254. **Reducing the Viscosity of Chlorinated Rubber.** L. Mellersh-Jackson, (Hercules Powder Co.).

Germany

701,913. **Reclaiming Old Rubber.** F. Kropfl, Vienna.

702,172. **Treating Chlorinated Rubber** with Small Amounts of Organic Bases. T. Goldschmidt A.G., Essen.

702,209. **Improving Processing Qualities and Solubility of Rubber-Like Polymerizates of Butadiene.** I. G. Farbenindustrie A.G., Frankfurt a.M.

703,210. **Stabilizing Unvulcanized Synthetic Rubber.** I. G. Farbenindustrie A.G., Frankfurt, a.M.

702,411. **Plasticizer or Filler** for Rubber or Synthetics. I. G. Farbenindustrie A.G., Frankfurt a.M.

702,618. **Antiager** for Rubber or Rubber-Like Synthetics. I. G. Farbenindustrie A.G., Frankfurt a.M.

702,659. **Improving the Qualities of Polyvinyl Alcohols or Their Partial Derivatives.** Chemische Forschungsgesellschaft m.b.H., Munich.

702,660. **Plasticizer or Filler** for Rubber or Synthetics. I. G. Farbenindustrie A.G., Frankfurt a.M.

UNCLASSIFIED

United States

2,234,353. **Cellulose Derivative Electrical Insulating Material.** A. L. Quinlan, La Grange, Ill., assignor to Western Electric Co., Inc., New York, N. Y.

2,234,791. **Windshield Wiper Clip.** M. Zaiger, Swampscott, Mass.

2,234,996. **Cable Making Machine.** A. U. Welch, Jr., and C. M. Cederstrom, Pittsfield, Mass., assignor to General Electric Co.

2,235,082. **Plied Cord Structure** for Reenforcing Rubber, Comprising Strong Rayon Threads Having a Denier in Excess of 500, Constructed by a Single Plying Operation, the Singles Twist in Turns per Inch Being not Less Than the Cord Twist. H. H. Parker, Kenmore, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,235,575. **Cable Stripping Tool.** T. Edwards, San Francisco, Calif.

2,235,622. **Testing Tire Cords.** F. Ray, Short Hills, N. J., assignor to Wingfoot Corp., Wilmington, Del

2,235,716. **Air Pressure Indicating Apparatus** for Pneumatic Tires G. P. Lucius, assignor of two-fifths to J. C. Twiner and one-fifth to H. L. Herring, all of Ruleville, Miss.

2,235,930. **Pneumatic Tire Air Pressure Indicating Means.** J. D. Huggins, Jr., Boiling Springs, N. C.

2,235,953. **Apparatus for Applying Road Rollers** to Convertible Vehicles. W. B. Whitfield, Huntsville, Ala.

2,236,585. **Tire Valve.** J. Wahl, Rosedale, N. Y., assignor to Scovill Mfg. Co., Waterbury, Conn.

2,236,587. **Tire Valve.** S. T. Williams, Bellerose, N Y., assignor to Scovill Mfg. Co., Waterbury, Conn.

2,236,936. **Device to Apply Rubber Bands to Packages.** W. W. Camp, Castorland, N. Y.

2,237,201. **Tire Rim Tool.** N .B. Stone, Riverdale, Md.

2,237,247. **Wheel Construction.** W. S. Brink, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,237,267. **Making Insulating Yarns or Rovings.** W. F. Astley, Cicero, assignor to Union Asbestos Rubber Co., Chicago, both in Ill.

2,237,524. **Tire Inflation Signal.** J. D. Francisco, assignor to Signal-Air Co., both of Akron, O.

Dominion of Canada

395,249. **Tire Anti-Skid Chain.** J. A. H. Lasnier, Iberville, P. Q.

395,408. **Tire Tube Tester.** A. E. Lookholder, La Grange, Ill., U. S. A.

395,479. **Key Retainer Identification Tag.** B. F. Goodrich Co., assignee of H. V. Williams, Jr., both of New York, N. Y., U. S. A.

395,612. **Tire Valve Stem.** Dill Mfg. Co., Cleveland, assignee of J. C. Crowley, Cleveland Heights, both in O., U. S. A.

United Kingdom

533,091. **Rims to Hold Tires** during Work Thereon. Tyresoles, Ltd., and A. W. Baker.

533,482. **Deflation Indicating** Means for Twin Tires. Dunlop Rubber Co., Ltd.

533,498. **Safety Mechanisms** for Wringers, Etc. Lovell Mfg. Co.

533,995 and 533,996. **Wheel Construction.** Firestone Tire & Rubber Co., Ltd.

534,246. **Clips** for Securing Rubber and Like Hose to Metal and Other Tubes. Linolite, Ltd., and A. W. Beuttell.

TRADE MARKS

United States

339,840. **Walling's Custom.** Shoes. Lynn Shoe Outlet, Inc., New York, N. Y.

340,760. **Drug-Pak.** Prophylactics. Nutex Co., Philadelphia, Pa.

341,018. Representation of a sole containing the words: **"Indian-Moc."** Footwear. Foot Form Shoe Shops, Inc., New York, N. Y.

341,040. **Wilbar's.** Shoes. Wilbar's, Inc., Boston, Mass.

341,308. **Kling-tite.** Prophylactics. Youngs Rubber Corp., Inc., New York, N. Y.

341,545. **Pullman.** Rubber cement, etc. Pullman Chemical Co., Camden, N. J.

341,661. **Speed Duty.** Tires and tubes. Badger Rubber Works, Chicopee Falls, Mass.

341,838. **Bali Bra.** Girdles, etc. Fay-Miss Brassiere Co., Inc., New York, N. Y.

342,068. **Westminster.** Tires and tubes. Westminster Tire Corp., New York, N. Y.

342,384. **Multi-Grip.** Tires and tubes. Fisk Rubber Corp., Chicopee Falls, Mass.

343,218. **Hickok Baby Buffalo.** Suspenders. Hickok Mfg. Co., Inc. Rochester, N. Y.

344,096. **Cranbrook.** Clothing and shoes. Associated Merchandising Corp., New York, N. Y.

344,102. **Alan McAfee.** Footwear. Church & Co., Ltd., Northampton, England.

344,706. **Cog Belt.** V-belts. Dayton Rubber Mfg. Co., Dayton, O.

344,710. **Eby.** Radio instrument parts, including rubber plugs, etc. Hugh H. Eby, Inc., Philadelphia, Pa.

344,924. **Sturd-i-Form.** Footwear. A. I. Namm & Son, doing business as The Namm Store, Brooklyn, N., Y.

344,929. **Child-forme.** Shoes. Child-Forme Shoe Co., Inc., Brooklyn, N. Y.

344,934. **Detaché.** Foundation garments. Poirette Corsets, Inc., New York, N. Y.

344,935. **Dual Stretch.** Foundation garments. Poirette Corsets, Inc., New York, N. Y.

345,344. **Diesel.** Tires, tubes, and patches. Diesel Tire Corp., New York, N. Y.

345,558. **Elastic Shell.** Balls. J. de Beer & Son, Albany, N. Y.

346,016. **Smoke Test.** Prophylactics. W. H. Reed, doing business as W. H. Reed & Co., Atlanta, Ga.

346,025. **Maggy Rouff.** Clothing, shoes, hosiery. Maggy Rouff, Paris, France.

346,041. **Di Martini.** Shoes. J. Goodman Shoe Co., New York, N. Y.

346,316. **Esquire.** Tires and tubes. Norwalk Tire & Rubber Co., Inc., Norwalk, Conn.

346,684. **Fitafut.** Footwear. Rosenberg Bros. Slipper Co., Inc., Norwalk, Conn.

346,895. **Free-Bak.** Foundation garments. La Resista Corset Co., Bridgeport, Conn.

347,199. **Foregger.** Medical and surgical appliances. Foregger Co., Inc., New York, N. Y.

347,427. **Shrink Nix.** Covered rubber thread and elastic webbing. United Elastic Corp., Easthampton, Mass.

347,445. **Sure Grip.** Tires. M. R. Albert, doing business as Albert Tire Co., Philadelphia, Pa.

347,871. **Blair's Correct—U.** Abdominal belts. Blair Corset Co., Inc., Chicago, Ill.

348,118. **Midwate.** Elastic hosiery. Horn Surgical Co., Philadelphia, Pa.

348,329. Representation of a shoe outline containing a smaller foot outline superimposed above the shoe arch. Shoes and insoles. B. J. Silver, New York, N. Y.

348,341. **Brockman Stixon.** Rubber and leather soles and heels. O. Brockman, doing business as Oscar Brockman Co., Louisville, Ky.

348,342. **Vassar fashion shoes—Gimbel Brothers.** Shoes. Gimbel Bros., Inc., New York.

348,550. **Sandringham.** Clothing, shoes, accessories. Gimbel Bros., Inc., New York, N. Y.

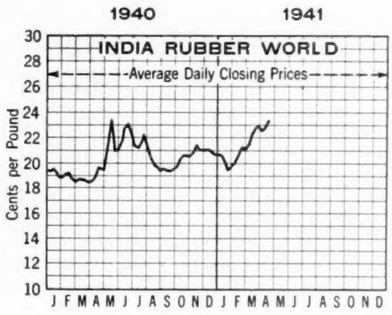
Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES ON THE NEW YORK MARKET

Futures	Feb. 22	Mar. 29	Apr. 5	Apr. 12	Apr. 19	Apr. 26
"New" Standard						
Apr.	.....	22.68	22.19	22.82	22.75	22.90
May	.....	22.65	22.19	22.82	22.75	22.90
July	20.20	22.18	21.35	21.60	21.86	22.48
Sept.	20.00	21.70	21.05	21.30	21.40	22.00
Dec.	19 80	21.40	20.75	20.95	21.10	21.68
Jan.	19.75	21.25	20.65	20.85	21.00	21.58
Mar.	.....	.....	20.45	20.65	20.80	21.38
No. 1 Standard						
May	20.72	22.65	22.19	22.82	22.75	22.90
Volume per week (tons)	5,610	4,340	4,820	3,000	7,830	4,750



New York Outside Market—Spot No. 1-X Ribbed Smoked Sheets

CRUDE rubber prices held firm last month. July futures (new contract), after closing at 21.95¢ per pound on March 31, dropped to 20.82¢ on April 8, and then gained strength to close at 22.05¢ on April 24. Thereafter the market was stronger with July closing at 22.99¢ on April 29.

The shipping situation continued to hold the spotlight last month. During April, 113,000 tons of shipping space were said to have been made available for rubber to the United States, and ships for May are reported to have been requisitioned by the Rubber Reserve Co. There were also reports of the possibility of using army transports for rubber. These boats are heavily laden when west-bound to army establishments in Hawaii and the Philippines, but have little cargo on the east-bound trip. Other talk centered about shipments from the Far East to Pacific ports instead of through the canal, which reportedly would take 34 days off the all-water route. Trans-shipment to consuming centers would be by rail, and railroads were reported to be planning rates for the eastern haul. Added transportation and handling charges would have to be considered in such a move.

According to the International Rubber Regulation Committee, January-February net exports of agreement countries excluding Thailand and French Indo-China were 23,733 tons below permissibles. Deducting the pro-rata overshipment carryover from 1940, the net undershipments for January-February would be 22,765 tons. Preliminary figures for March indicate overshipments from Malaya of about 20,000 tons, and Netherland East Indies shipments were about equal to the permissible figure. These figures of the two principal producers indicate that much of the January-February deficiency was made up in March.

United States imports of crude rubber during March amounted to 87,123 long tons, 69,091 tons of which were trade arrivals and the balance for government rubber supplies which were increased from 145,570 tons to 163,602 tons during March. As indicated here last month, crude rubber consumption in the United States during March was close to 67,000 long tons, the actual figure of 66,821 tons was a record all-time high. April use continues at the record March rate and may be expected to reach the 66,000-ton level again.

New York Outside Market Rubber Quotations

Latex	Apr. 26, 1940	Mar. 28, 1941	Apr. 25, 1941
Normal, 38-40%, *gal.*	$0.76/0.77	$0.86/0.87	$0.87/0.89
Centrifuged, 60-63% ....*gal.*	.. ..	1.48/1.49	1.47/1.50
Paras			
Upriver fine....*lb.*	.18¼	.22¼	.29½
Upriver fine....*lb.*	*.20¾	*.24½	*.32
Upriver coarse.*lb.*	.11½	.14	.15
Upriver coarse.*lb*	*.17½	*.21	*.24
Islands fine....*lb.*	.18	.22	.29
Islands fine....*lb.*	*.20	*.24	*.32
Acre, Bolivian fine ....*lb.*	.18½	.22½	.30
Acre, Bolivian fine ....*lb.*	*.21	*.25	*.32
Beni, Bolivian fine ....*lb.*	.19	.22½	.31
Madeira fine...*lb.*	.18¼	.22¼	.29½
Caucho			
Upper ball.....*lb.*	.11½	.14	.15
Upper ball.....*lb.*	*.17½	*.21	*.24
Lower ball.....*lb.*	.11	.13½	.14½
Pontianak			
Pressed block..*lb.*	.13/.17	.16/.24	.12/.25
Guayule			
Ampar ....*lb.*	.15	.15½	.15½
Africans			
Rio Nuñez .. *lb.*	.18½	.19	.19
Black Kassai...*lb.*	.18½	.19½	.19
Prime Niger flake ....*lb.*	.22½	.30	.30
Gutta Percha			
Gutta Siak ....*lb.*	.17½	.16	.16½
Gutta Soh .....*lb.*	.27	.24	.25
Red Macassar..*lb.*	1.20	1.20	1.20
Balata			
Block Ciudad Bolivar .....*lb.*	.40	.45	.43
Manaos block..*lb.*	.40	.52	.45
Surinam sheets.*lb.*	.45	.51	.52
Amber .....*lb.*	.50	.53	.54

* Washed and dried crepe. Shipments from Brazil.

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	March, 1941							April, 1941			
	24	25	26	27	28	29	31	1	2	3	4
No. 1-X R.S.S. in cases*...	22¾	22¾	23	23⅛	23⅛	23⅛	22⅞	22⅝	22⅜	22½	22¼
No. 1 Thin Latex Crepe....	23¼	23¼	23½	23⅝	23⅝	23⅝	23½	23¼	23	23⅛	22⅞
No. 2 Thick Latex Crepe...	23¼	23¼	23½	23⅝	23⅝	23⅝	23½	23¼	23	23⅛	22⅞
No. 1 Brown Crepe........	22⅛	22⅛	22⅜	22⅝	22⅝	22⅝	22⅜	22⅛	22¼	22⅜	22⅛
No. 2 Brown Crepe........	21⅞	21⅞	22⅛	22⅜	22⅜	22⅜	22⅛	21⅞	22	22⅛	21⅞
No. 2 Amber	22⅛	22⅛	22⅜	22⅝	22⅝	22⅝	22⅜	22⅛	22¼	22⅜	22⅛
No. 3 Amber	21⅞	21⅞	22⅛	22⅜	22⅜	22⅜	22⅛	21⅞	22	22⅛	21⅞
Rolled Brown	20¾	20¾	21	21¼	21¼	21¼	21	20¾	21	21⅛	20⅞

	April, 1941												
	5	7	8	9	10	11†	12	14	15	16	17	18	19
No. 1-X R.S.S. in cases*...	22½	22⅜	22¼	22¾	22⅞	..	23	23⅛	23½	23½	23⅛	23	23⅛
No. 1 Thin Latex Crepe....	23⅛	23⅛	23	23½	23⅝	..	23¾	23⅞	24½	24½	24	23⅞	24
No. 2 Thick Latex Crepe...	23⅛	23⅛	23	23½	23⅝	..	23¾	23⅞	24½	24½	24	23⅞	24
No. 1 Brown Crepe........	22⅜	22¼	22⅛	22⅝	22¾	..	22⅞	23	23⅜	23⅜	23	22⅞	23
No. 2 Brown Crepe........	22⅛	22	21⅞	22⅜	22½	..	22⅝	22⅞	23⅛	23⅛	22¾	22⅝	22⅞
No. 2 Amber	22⅜	22¼	22⅛	22⅝	22¾	..	22⅞	23	23⅜	23⅜	23	22⅞	23
No. 3 Amber	22⅛	22	21⅞	22⅜	22½	..	22⅝	22⅞	23⅛	23⅛	22¾	22⅝	22⅞
Rolled Brown	21⅛	21	20⅞	21⅜	21½	..	21⅝	21¾	22	22	21¾	21⅝	21¾

*No. 1 Ribbed Smoked Sheets are ⅛¢ lower than No. 1-X R.S.S. in cases quoted here. †Closed.

New York Outside Market (Continued)

	April, 1941					
	21	22	23	24	25	26
No. 1-X R.S.S. in cases*..................	23⅛	23	22⅞	23	23¼	23⅜
No. 1 Thin Latex Crepe....................	24	23⅞	23⅝	23¾	24	24⅛
No. 2 Thick Latex Crepe...................	24	23⅞	23⅝	23¾	24	24⅛
No. 1 Brown Crepe.........................	23	22⅞	22¾	22⅞	23⅛	23¼
No. 2 Brown Crepe.........................	22⅞	22¾	22⅝	22¾	23	23⅛
No. 2 Amber...............................	23	22⅞	22¾	22⅞	23⅛	23¼
No. 3 Amber...............................	22⅞	22¾	22⅝	22¾	23	23⅛
Rolled Brown	21¾	21⅝	21½	21⅝	22	22⅛

Rubber Trade Inquiries

The inquiries below are of interest not only in showing the needs of the trade, but because additional information may be furnished by readers. The Editor is glad to have those interested communicate with him.

No.	INQUIRY
2837	Manufacturers of ultra-accelerators for vulcanizing latex at room temperature.
2838	Manufacturers of six- or eight-ounce battery filler type of bulbs.
2839	Manufacturers of rubber riding boots.
2840	Manufacturers of paints for sponge rubber shoes.

New York Outside Market

The Outside Market continued active last month, with demand from factories well maintained. The market was firm, and No. 1-X ribbed smoked sheets, in cases, closed at 22⅞¢ per pound on March 31, dropped to 22¼¢ on April 8, and then advanced to close at 23¢ per pound on April 25. The closing price on April 29 was 23¾¢, with the market stronger. The price of off-grades, supplies of which are limited, advanced more rapidly than smoked sheets and in some cases to higher levels than the standard grade. Para grades were particularly strong and advanced from 22¼-22½¢ on April 1 to 28¢ on April 24, an advance of over 5¢ per pound. Rubber in the Boston market was reported to be running ¼¢ to ½¢ per pound above the New York market, because ships have not been discharging rubber in that port in normal quantities.

Importers report that Far Eastern shippers are offering rubber with the buyer to furnish the shipping space.

United States Latex Imports

Year	Pounds (d.r.c)	Value
1938	26,606,048	$ 4,147,318
1939	61,460,003	10,467,552
1940	**75,315,775**	**14,543,975**
1941		
Jan.	4,892,860	1,019,741
Feb.	6,598,930	1,279,648

Data from Leather and Rubber Division, Washington, D. C.

RECLAIMED RUBBER

According to R. M. A. figures, March reclaimed rubber consumption is estimated at 19,149 long tons, 7.6% above that of February; production, 22,006 long tons; and stocks on hand March 31, 39,861 long tons. Production of reclaim is reported to be at capacity levels, and the demand during April was said to be at a higher lever than March, with all consuming branches of the rubber industry active. According to the Department of Commerce, 2,260,581 pounds of reclaim were exported during February, with 1,381,903 pounds going to Canada and 415,933 pounds to the United Kingdom. January exports were 1,293,051 pounds.

Owing to increases in scrap rubber prices, reclaim prices were all advanced to higher levels. Tire and shoe grades are up ½¢ per pound; red tubes advanced 1¢, and compound tubes quoted at 9 to 10¼¢ moved up to 9¾ to 11¼¢; mechanical blends, formerly 4½¢ to 5¢, are now 4½¢ to 5¼¢; and white reclaim advanced from 12½-14¢ to 13½-14½¢. The tone of market continues firm.

New York Quotations

April 25, 1941

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6½/ 6¾
Acid	1.18-1.22	7½/ 7¾
Shoe		
Standard	1.56-1.60	7 / 7¼
Tubes		
Red Tube	1.15-1.30	10½/10¾
Compound	1.10-1.20	9¾/11¼
Miscellaneous		
Mechanical Blends	1.25-1.50	4½/ 5¼
White	1.35-1.50	13½-14½

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

United States Reclaimed Rubber Statistics—Long Tons

Year	Production†	Consumption†	Consumption % of Crude	U. S. Stocks*†	Exports
1938	122,403	120,800	27.6	23,000	7,403
1939	186,000	170,000	28.7	25,250	12,611
1940	209,001	187,090	30.3	34,701	12,565
1941					
Jan.	20,413	18,636	29.0	35,344	577
Feb.	19,507	**17,793**	**29.2**	**37,104**	...
Mar.	22,006	19,149	28.6	39,861	...

*Stocks on hand the last of the month or year. †Corrected to 100% from estimates of reported coverage. *Compiled by The Rubber Manufacturers Association, Inc.*

Tire Production Statistics

	Pneumatic Casings		
	Inventory	Production	Shipments
1939	8,664,505	57,612,731	57,508,775
1940	9 178,537	59,352,643	59,155,326
1941			
Jan.	**9,797,253**	**5,472,043**	**4,846,991**
Feb.	10,071,857	5,165,404	4,910,365
Mar.	10,168,237	5,686,686	5,528,552

	Pneumatic Casings		
	Original Equipment	Replacement Sales	Export Sales
1939	18,207,556	38,022,034	1,279,185
1940	22,261,723	35,724,034	1,169,569
1941			
Jan.	2,292,704	2,420,947	133,340
Feb.	2,547,285	2,216,684	146,396
Mar.	2,639 876	2,738,597	150,079

	Inner Tubes		
	Inventory	Production	Shipments
1939	7,035,671	50,648,556	51,190,314
1940	7 014,154	52,350,867	52,306,767
1941			
Jan.	**7,732,655**	**5,168,380**	**4,527,427**
Feb.	8,004,383	4,993,131	4,712,828
Mar.	8,070,026	5,357,354	5,186,157

	Inner Tubes		
	Original Equipment	Replacement Sales	Export Sales
1939	**18,190,630**	**31,997,906**	**1,001,778**
1940	**22,181,862**	**29,134,442**	**990,463**
1941			
Jan.	**2,282,899**	**2,134,582**	**109,946**
Feb.	2,547,081	2 034,488	131,259
Mar.	2,649,010	2,409,849	127,298

Source: The Rubber Manufacturers Association, Inc. Figures adjusted to represent 100% of the industry.

World Net Imports of Crude Rubber—Long Tons

Year	U.S.A.	U.K.†	Argentine	Australia	Belgium	Canada	France	Greater Germany‡	Italy	Japan	Poland	Sweden	U.S.S.R.	Rest of World	Total
1938	406,300	168,172	7,700	12,300	11.300	25,700	58,100	107 900	28,200	46,300	7,900	8,300	26,800	49,200	928,000
1939	486,348	112,249¶	9,600	15 400	9,600	32,500	33,751§	62,344§	12,582§	42,300	5,415§	7,965a	14,000*	61,866	603,842*
1940	810,724	....	....	19,044	1,585b	52,567	....	....	....	30,847c	....	....	....	....	....
1940															
Jan.	71,541	....	1,049	921	891	5,047	....	....	....	4,547	....	....	....	....	....
Feb.	41,797	....	565	1,846	694	3,508	....	....	....	5,243	....	....	....	....	....
Mar.	58,283	....	756	1,784	....	3,062	....	....	....	6,057	....	....	....	....	....
Apr.	70,135	....	606	1,612	....	3,096	....	....	....	2 000*	....	....	....	....	....
May	50,621	....	589	2,128	....	3,108	....	....	....	2,500*	....	....	....	....	....
June	53,266	....	543	1,181	....	1,062	....	....	....	3,000*	....	....	....	....	....
July	69,374	....	783	1,902	....	5,112	....	....	....	3,000*	....	....	....	....	....
Aug.	72,612	....	767	2,508	....	4,605	....	....	....	4,500*	....	....	....	....	....
Sept.	78,126	....	1,216	2,485	....	2,743	....	....	....	....	....	....	....	....	....
Oct.	74,400	....	1,000*	590	....	8,336	....	....	....	....	....	....	....	....	....
Nov.	72,775	....	1,181	1,366	....	5,451	....	....	....	....	....	....	....	....	....
Dec.	97,794	....	....	721	....	7,437	....	....	....	....	....	....	....	....	....
1941															
Jan.	86,541	....	....	1,065	....	6,290	....	....	....	....	....	....	....	....	....

*Estimated, and to Aug. 31, 1939, only. †U. K. figures show gross imports, not net imports. ‡Including imports of Austria and Czechoslovakia. ¶Up to Aug. 31, 1939, only. §Up to July 31, 1939, only. aUp to Sept. 30, 1939. bJan.-Feb. cJan.-Aug. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

COMPOUNDING INGREDIENTS

THE demand for all types of compounding materials by the rubber industry continued at peak levels during April, with no falling off in sight.

CARBON BLACK. The demand, very strong prior to the price advance on April 1, slackened somewhat during the first part of last month. Heavy movement was resumed at mid-month. Exports, which have been light since the start of the war, were further restricted when the material was recently placed on the export license list. Heavy domestic purchasing during March resulted in producers' inventories dropping from 158,000,000 pounds to 140,000,000 pounds.

FACTICE OR RUBBER SUBSTITUTE. The demand showed a further increase last month and is now at a high level. Prices are firm, with standard grades generally unchanged. The oil market condition is reported to be such that prices may be expected to strengthen.

LITHARGE. The car lot price advanced 0.10¢ per pound, with movement heavy.

LITHOPONE. The demand continued active, and prices are unchanged.

RUBBER CHEMICALS. The demand, at an exceptionally high level during the first quarter, was well maintained last month. Prices are generally steady, with no indication of substantial changes in the near future.

RUBBER SOLVENTS. Rubber solvent naphthas of all types continue in excellent demand. Heavy movement and recent crude oil price advances have resulted in a firmer market, with actual price increases in some cases.

TITANIUM PIGMENTS. The demand was reported at peak levels and running 15 to 20% ahead of last year. Prices are firm and unchanged.

ZINC OXIDES. Consumption continues at a high rate. Several producers are reported to be still marketing oxides from the various types of zinc metal. On March 30 maximum prices were set by the Government on zinc scrap and secondary slab zinc. Oxide prices continue steady.

Current Quotations*

Abrasives

Pumicestone, powdered	lb.	$0.035	$0.0475
Rottenstone, domestic	lb.	.025	.03

Accelerators, Inorganic

Lime, hydrated, *l.c.l.*, New York	ton	20.00	
Litharge (commercial)	lb.	.08	

Accelerators, Organic

A-1	lb.	.24	.30
A-10	lb.	.31	.35
A-19	lb.	.52	.65
A-32	lb.	.70	.80
A-77	lb.	.42	.55
A-100	lb.	.42	.55
Accelerator 49	lb.	.41	.42
531	lb.	.48	.50
737	lb.	.42	.43
737-50	lb.	.25	.26
808	lb.	.70	.72
833	lb.	1.15	
Acrin	lb.	.60	
Aldehyde ammonia	lb.	$0.65	$0.70
Altax	lb.	.55	.60
B-J-F	lb.	.50	.55
Beutene	lb.	.70	.75
Butyl Eight	lb.	.98	1.00
Zimate	lb.	2.15	
C-P-B	lb.	2.00	
Captax	lb.	.50	
Crylene	lb.		
Paste	lb.		
D-B-A	lb.	2.00	
Delac A	lb.	.40	.50
O	lb.	.40	.50
P	lb.	.40	.50
Di-Esterex-N	lb.	.60	.70
DOTG (Di-ortho-tolyguanidine)	lb.	.44	.46
DPG (Diphenylguanidine)	lb.	.35	.45
El-Sixty	lb.	.50	.65
Ethylidene aniline	lb.	.42	.43
Ethyl Zimate	lb.	2.15	
Formaldehyde P.A.C.	lb.	.06	
Formaldehyde-para-toluidine	lb.	.52	.54
Formaniline	lb.	.31	.32
Guantal	lb.	.40	.50
Hepteen	lb.	.35	.40
Base	lb.	1.35	1.50
Hexamethylenetetramine U.S.P.	lb.	.39	
Technical	lb.	.33	
Lead oleate, No. 999	lb.	.14	
Witco	lb.	.15	
Ledate	lb.	2.00	
Monex	lb.	2.00	
Novex	lb.		
O-X-A-F	lb.	.50	.55
Oxynone	lb.	.77	.90
Para-nitroso-dimethylaniline	lb.	.85	
Pentex	lb.	1.00	1.10
Flour	lb.	.15	.16
O	lb.		
Flour	lb.		
Phenex	lb.	.50	.55
Pip-Pip	lb.	2.15	
Pipsolene	lb.	1.55	1.80
R-23	lb.	.40	
R & H 50-D	lb.	.42	.43
Rotax	lb.	.60	.65
Safex	lb.	1.20	1.30
Santocure	lb.	.80	1.00
Selenac	lb.	2.50	
SPDX	lb.	.70	.75
A	lb.	.70	.75
Super-sulphur No. 1	lb.	.50	
2	lb.	.18	.20
Tetrone A	lb.	2.35	
Thiocarbanilide	lb	.24	.30
Thionex	lb	2.00	
Thiurad	lb.	2.00	
Trimene	lb.	.55	.65
Base	lb.	1.05	1.20
Triphenylguanidine (TPG)	lb.	.45	
Tuads	lb.	2.00	
2-MT	lb.	.54	
Ulto	lb.	1.25	1.50
Ureka	lb.	.60	.75
Blend B	lb.	.60	.75
C	lb.	.56	.65
Vulcanex	lb.	.42	.43
Vulcanol	lb.	.85	
Z-B-X	lb.	2.50	
Zenite	lb.	.46	.48
A	lb.	.53	.55
B	lb.	.46	.48
Zimate (Methyl)	lb.	2.00	

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of known ingredients. Requests for information not recorded will receive prompt attention.

Activators

Aero Ac 50	lb.	.46	.52
Barak	lb.	.50	
MODX	lb.	.30	.35
SL No. 20	lb.	.085	.10

Age Resisters

AgeRite Alba	lb.	2.00	
Exel	lb.	1.00	1.02
Gel	lb.	.57	.59
Hipar	lb.	.65	.67
Powder	lb.	.52	.54
Resin	lb.	.52	.54
D	lb.	.52	.54
White	lb.	1.25	1.40
Akroflex C	lb.	.56	.58
Albasan	lb.	.70	.75
Aminox	lb.	.52	.61
Antox	lb.	.56	
Betanox	lb.	.52	.61
Special	lb.	.65	.74
B-L-E	lb.	.52	.61
Powder	lb.	.65	.74
B-X-A	lb.	.52	.61
Copper Inhibitor X-872-A	lb.	1.15	
Flectol B	lb.	.52	.65
H	lb.	.52	.65
White	lb.	.90	1.15
M-U-F	lb.	1.50	
Neozone (standard)	lb.	.63	
A	lb.	.52	.54
B	lb.	.63	
C	lb.	.52	.54
D	lb.	.52	.54
E	lb.	.63	
Oxynone	lb.	.68	
Parazone	lb.	.77	.90
Permalux	lb.	$1.20	
Santoflex B	lb.	.52	$0.65
BX	lb.	.58	.71
Santovar A	lb.	1.15	1.40
Solux	lb.	1.30	
Stabilite	lb.	.52	.54
Alba	lb.	.70	.75
Thermoflex	lb.	1.20	1.15
A	lb.	.65	.67
Tysonite	lb.	.16	.165
V-G-B	lb.	.52	.61

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 *lbs.*	2.70	3.55
liquid, 50%	100 *lbs.*	1.95	
solid (700-*lb. drums*)	100 *lbs.*	2.30	3.15

Antiscorch Materials

A-F-B	lb.	.35	.40
Antiscorch T	lb.	.90	
Cumar RH	lb.	.10	
E-S-E-N	lb.	.35	.40
R-17 Resin (*drums*)	lb.	.10	
RM	lb.	1.25	
Retarder W	lb.	.36	
Retardex	lb.	.45	.48
U-T-B	lb.	.35	.40

Antiseptics

Compound G-4	lb.		
G-11	lb.		

Antisun Materials

Heliozone	lb.	.22	.23
S.C.R.	lb.	.33	.35
Sunproof	lb.	.22	.27

Blowing Agents

Ammonium Carbonate, lumps (500-*lb. drums*)	lb.	.0825	
Unicel	lb.	.50	

Brake Lining Saturant

B.R.T No. 3	lb.	.0165	.0175

Colors

Black

Du Pont powder	lb.	.42	.44
Lampblack (commercial), *l.c.l.*	lb.	.15	

Blue

Du Pont Dispersed	lb.	.83	3.95
Powders	lb.	2.25	3.75
Toners	lb.	.08	3.85

Brown

Mapico	lb.	.11	

Green

Chrome	lb.	.23	
oxide (*freight allowed*)	lb.		
Du Pont Dispersed	lb.	.98	2.85
Powders	lb.	1.00	5.50
Guignet's (*bbls.*)	lb.	.70	
Toners	lb.	.85	3.75

Orange

Du Pont Dispersed	lb.	.88	2.00
Powders	lb.	.88	2.75
Toners	lb.	.40	1.60

Orchid

Toners	lb.	1.50	2.00

Pink

Toners	lb.	1.50	2.00

Purple

Toners	lb.	.60	2.10

Red

Antimony			
Crimson, 15/17%	lb.	.30	
R. M. P. No. 3	lb.	.48	
Sulphur free	lb.	.52	
R.M.P.	lb.	.52	
Golden 15/17%	lb.	.28	
7-A	lb.	.37	
Z-2	lb.	.23	
Cadmium, light (400-*lb. bbls.*)	lb.	.75	.80
Du Pont Dispersed	lb.	.93	2.05
Powders	lb.	.285	1.65
Iron Oxide, *l.c.l.*	lb.	.06	.11
Mapico	lb.	.0925	
Rub-Er-Red (*bbls.*)	lb.	.0925	
Toners	lb.	.08	2.00

White

Lithopone (*bags*)	lb.	.0385	.0410
Albalith	lb.	.0385	.0410
Astrolith (50-*lb. bags*)	lb.	.0385	.0410
Azolith	lb.	.0385	.0410
Titanium Pigments			
Ray-bar	lb.	.055	.065
Ray-cal	lb.	.0525	.0625
Rayox	lb.	.135	.165
Titanolith (50-*lb. bags*)	lb.	.0525	.055

Titanox-A .... lb. $0.135 /$0.165
B .... lb. .055 / .065
30 .... lb. .055 / .065
C .... lb. .0525/ .0625
M .... lb. .055 / .065
Ti-Tone .... lb.
Zopaque (50-lb. bags) .... lb. .135 / .14
Zinc Oxide
Azo ZZZ-11 .... lb. .065 / .0675
44 .... lb. .065 / .0675
55 .... lb. .065 / .0675
66 .... lb. .075 / .0775
French Process, Florence
Green Seal-8 .... lb. .0825/ .0850
Red Seal-9 .... lb. .0775/ .08
White Seal-7 .... lb. .0875/ .09
Kadox, Black Label-15 .... lb. .065 / .0675
No. 25 .... lb. .0775/ .08
Red Label-17 .... lb. .065 / .0675
Horse Head Special 3 .... lb. .065 / .0675
XX Red-4 .... lb. .065 / .0675
23 .... lb. .065 / .0675
72 .... lb. .065 / .0675
78 .... lb. .065 / .0675
80 .... lb. .065 / .0675
103 .... lb. .065 / .0675
110 .... lb. .065 / .0675
St. Joe (lead free)
Black Label .... lb. .065 / .0675
Green Label .... lb. .065 / .0675
Red Label .... lb. .065 / .0675
U.S.P. .... lb. .0975/ .10
Zinc Sulphide Pigments
Cryptone-BA-19 .... lb. .0525/ .055
BT .... lb. .0525/ .055
CB .... lb. .0525/ .055
MS .... lb. .055 / .0575
ZS No. 20 .... lb. .0775/ .08
86 .... lb. .0775/ .08
230 .... lb. .0775/ .08
800 .... lb. .0775/ .08
Sunolith .... lb. .0385/ .0410

Yellow

Cadmolith (cadmium yellow), (400-lb. bbls.) .... lb. .50 / .55
Du Pont Dispersed .... lb. 1.25 / 1.75
Powders .... lb. .135 / 1.37
Mapico .... lb. .0675
Toners .... lb. 2.50

Dispersing Agents

Bardex .... lb. .0395/ .042
Bardol .... lb. .0225/ .025
Darvan No. 1 .... lb. .30 / .34
No. 2 .... lb. .30 / .34
Nevoll (drums, c.l.) .... lb. .0225
Santomerse S .... lb. .11 / .25

Fillers, Inert

Asbestine, c.l. .... ton 15.00
Barytes .... ton 30.00 /36.00
f.o.b., St. Louis (50-lb. paper bags) .... ton 22.85
off color, domestic .... ton 21.50 /26.50
white, imported .... ton 30.00 /36.00
Blanc fixe, dry, precip. .... lb. .03 / .035
Calcene .... ton 37.50 /43.00
Infusorial earth .... lb. .03 / .035
Kalite No. 1 .... ton 24.00 /30.00
3 .... ton 34.00 /40.00
Kalvan .... ton 95.00
Magnesia, calcined, heavy .... lb.
Magnesium Carbonate, l.c.l. .... lb. .0725/ .095
Paradene No. 2 (drums) .... lb. .045
Pyrax A .... ton 6.50
Vinsol Resin .... lb.
Whiting
Columbia Filler .... ton 9.00 /14.00
Suprex, white extra light .... ton 30.00
heavy .... ton 30.00
Witco, c.l. .... ton 6.00

Finishes

Black-Out (surface protective) .... gal. 4.00 / 5.00
Mica, l.c.l. .... ton 42.00 /52.00
Rubber lacquer, clear .... gal. 1.00 / 2.00
colored .... gal. 2.00 / 3.50
Shoe Varnish .... gal. 1.45
Talc .... ton .025 / .035

Flock

Cotton flock, dark .... lb. .09 / .12
dyed .... lb. .40 / .60
white .... lb. .12 / .20
Rayon flock, colored .... lb. 1.00 / 1.50
white .... lb. .75 / 1.00

Latex Compounding Ingredients

A-342 .... lb. 1.00 / 1.25
Accelerator 85 .... lb. .35
89 .... lb. 1.40
122 .... lb. 1.55
552 .... lb. 2.15
Aerosol OT Aqueous 10% .... lb. .15
Antox, dispersed .... lb. .42
Aquarex D .... lb. .75
F .... lb. .85
Special WA Paste .... lb. .28
Areskap No. 50 .... lb. .18 / .24
100, dry .... lb. .39 / .51
Aresket No. 240 .... lb. .16 / .22
300, dry .... lb. .42 / .50
Aresklene No. 375 .... lb. .35 / .50
400, dry .... lb. .51 / .65
Black No. 25, dispersed .... lb. .22 / .40

Casein .... lb. $0.15 /$0.16
Collocarb .... lb. .07
Color Pastes, dispersed .... lb. .38 / 1.90
Copper Inhibitor X-872 .... lb. 2.25
Dispersex No. 15 .... lb. .11 / .12
No. 20 .... lb. .08 / .10
Factex Dispersion A .... lb. .16
Heliozone, dispersed .... lb. .25
Igepon A .... lb.
Latac .... lb. 2.50
MICRONEX, Colloidal .... lb. .055 / .065
Nekal BX (dry) .... lb.
Pipsol X .... lb. 3.05 / 3.55
R-2 Crystals .... lb. 2.50 / 2.75
RN-2 Crystals .... lb. 2.00 / 2.25
S-1 (400 lb. drums) .... lb. .65
Santobrite Briquettes .... lb.
Powder .... lb.
Santomerse D .... lb. .41 / .65
S .... lb. .11 / .25
Stablex A .... lb. .90 / 1.10
B .... lb. .65 / .90
C .... lb. .40 / .50
Sulphur, dispersed .... lb. .10 / .15
No. 2 .... lb. .075 / .12
T-1 (440-lb. drums) .... lb. .40
Tepidone .... lb. 1.03
Vulcan Colors .... lb.
Zenite Special .... lb. .55
Zinc oxide, dispersed .... lb. .12 / .15

Mineral Rubber

Black Diamond .... ton 25.00
B.R.C. No. 20 .... lb. .009 / .01
Hydrocarbon, hard .... ton 23.00 /27.00
Genasco Hydrocarbon, granulated .... ton
solid .... ton
Gilsonite .... ton
Parmr .... ton 23.00 /27.00
Pioneer .... ton
285°-300° .... ton 22.00

Mold Lubricants

Aluminum Stearate .... lb. .185 / .195
Aquarex D .... lb. .75
WA Paste .... lb. .25
Special .... lb. .28
Lubrex .... lb. .25 / .30
Mold Paste .... lb. .12 / .18
Rubber-Glo, conc. regular .... gal. .94 / 1.15
Type W .... gal. .99 / 1.20
Sericite .... ton 65.00 /75.00
Soapbark .... lb.
Soapstone, l.c.l. .... ton 25.00 /35.00

Oil Resistant

A-X-F .... lb. .82 / .85

Reclaiming Oils

B.R.V. .... lb. .032 / .0345
No. 1621 .... lb. .019 / .02
S.R.O. .... lb. .019 / .02
X-159 .... gal. .20
Rox No. 1 .... lb. .0225/ .025

Reenforcers

Carbon Black
Aerfloted Arrow Specification (bags only) .... lb. .03175†
Arrow Compact Granulized .... lb. .03175†
Certified Heavy Compressed (bags only) .... lb. .03175†
Spheron .... lb. .03175†
Continental, dustless .... lb. .03175†
Compressed (bags only) .... lb. .03175†
Disperso .... lb. .03175†
Dixie .... lb. .03175†
Dixiedensed .... lb. .03175†
66 .... lb. .03175†
Excello, dustless .... lb. .03175†
Fumonex .... lb. .03
ex. warehouses .... lb. .0525 / .06
Gastex .... lb. .03 / .07
Kosmobile .... lb. .03175†
66 .... lb. .03175†
Kosmos .... lb. .03175†
MICRONEX Beads .... lb. .03175†
Mark II .... lb. .03175
Standard .... lb. .03175
W-5 .... lb. .03175
W-6 .... lb. .03175
P-33 .... lb. .0475
Pelletex .... lb. .03 / .07
Supreme, dustless .... lb. .03175†
Thermax .... lb. .02
Velvetex .... lb. .04 / .06
"WYEX BLACK" .... lb. .03175†
Carbonex Flakes .... lb. .029 / .034
S .... lb. .03 / .0350
Clays
Aerfloted Paragon (50-lb. bags) .... ton 10.00
Suprex (50-lb. bags) .... ton 10.00
Barden .... ton 10.00
Catalpo, c.l. .... ton 30.00
Clay "L" .... ton 8.00
Chicora .... ton 10.00

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is $0.03 per pound; f.o.b. Hoboken (bulk) $0.0397; f.o.b. No. Atlantic Docks (bags), $0,0415. All prices are carlot.

China .... ton $22.50
Crown .... ton 10.00
Dixie .... ton 10.00
Hi-White .... ton 10.00
Langford .... ton 7.50
McNamee .... ton 10.00
Par .... ton 10.00
Paraforce, c.l. .... ton 60.00
Witco, c.l. .... ton 10.00
Cumar EX .... lb. .045
MH .... lb. .06 /$0.11
V .... lb. .09 / .12
Silene .... lb. .04 / .045

Reodorants

Amora A .... lb.
B .... lb.
C .... lb.
D .... lb.
Curodex 19 .... lb.
188 .... lb.
198 .... lb.
Para-Dors .... lb.
Rodo No. 0 .... lb. 3.50 / 4.00
10 .... lb. 4.50 / 5.00

Rubber Substitutes

Black .... lb. .08 / .12
Brown .... lb. .08 / .115
White .... lb. .085 / .135
Factice
Amberex .... lb. .32
Type B .... lb. .1875
Brown .... lb. .085 / .115
Fac-Cel B .... lb. .1325
C .... lb. .1325
Neophax A .... lb. .095
B .... lb. .095
White .... lb. .09 / .135

Softeners

B.R.T. No. 7 .... lb. .0165/ .0175
Bondogen .... lb. .98 / 1.05
Burgundy pitch .... lb.
Copene Resin .... lb. .20
Cycline oil .... gal. .14 / .20
Dispersing Oil No. 10 .... lb. .0335/ .036
Nuba resinous pitch (drums)
Grades No. 1 and No. 2 .... lb. .0265
3-X .... lb. .04
Nypene Resin .... lb. .016 / .0165
Palm oil (Witco), c.l. .... lb.
Palmol .... lb. .13
Para Flux .... gal. .09 / .18
No. 2016 .... gal. .125 / .20
Para Lube .... lb. .0425/ .048
Pine tar .... gal.
Oil .... gal. .30
Plastogen .... lb. .0775/ .08
Plastone .... lb. .27 / .30
R-19 Resin (drums) .... lb. .10
21 Resin (drums) .... lb. .10
Reogen .... lb. .12 / .18
RPA No. 1 .... lb. .65
2 .... lb. .65
3 .... lb. .46
Tackol .... lb. .085 / .18
Tonox .... lb. .52 / .61
Tonox D .... lb. .75 / .85
Witco No. 20, l.c.l. .... gal. .20
X-1 resinous oil (tank car) .... lb. .01

Softeners for Hard Rubber Compounding

Resin C. Pitch 45°C. M.P. .... lb. .013 / .014
60°C. M.P. .... lb. .013 / .014
75°C. M.P. .... lb. .013 / .014

Solvents

Beta-Trichlorethane .... gal.
Carbon Bisulphide .... lb. .05
Tetrachloride .... gal. .665
Cosol No. 1 .... gal. .25 / .30
No. 2 .... gal. .22 / .30
No. 3 .... gal. .25 / .30
Industrial 90% benzol (tank car) .... gal. .14
Skellysolve .... gal.

Stabilizers for Cure

Calcium Stearate .... lb. .205 / .225
Laurex (bags) .... lb. .1025/ .1275
Lead Stearate .... lb. .25
Stearex B .... lb. .105 / .115
Beads .... lb. .10 / .11
Stearic acid, single pressed .... lb. .105 / .115
Stearite, c.l. .... lb. .12
Zinc stearate .... lb. .25 / .28

Synthetic Rubber

Neoprene Type E .... lb. .65
G .... lb. .70
GN .... lb. .65
I .... lb. .70
KN .... lb. .75
M .... lb. .65
Latex Type 56 .... lb. .30
57 .... lb. .30
Synthetic 190 .... lb. .41

Tackifier

B.R.H. No. 2 .... lb. .017 / .02

(Continued on page 82)

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Feb. 22	Mar. 29	Apr. 5	Apr. 12	Apr. 19	Apr. 26
Apr.	.....	11.33	11.36	11.36	.....	.....
May	.....	11.31	11.34	11.34	11.23	11.14
July	10.15	11.24	11.29	11.28	11.18	11.15
Dec.	9.76	11.15	11.23	11.23	11.11	11.16
Jan.	9.73	11.12	11.20	11.21	11.09	11.13
Mar.	.....	11.10	11.22	11.22	11.12	11.17

New York Quotations

April 25, 1941

Drills

38-inch 2.00-yard	yd.	$0.15¼
40-inch 3.47-yard		.09½
50-inch 1.52-yard		.21⅞
52-inch 1.85-yard		.18½
52-inch 1.90-yard		.17¾/.18½
52-inch 2.20-yard		.17⅜
52-inch 2.50-yard		.15¼
59-inch 1.85-yard		.19

Ducks

38-inch 2.00-yard D. F.	yd.	.15½/.16
40-inch 1.45-yard S. F.		.21⅜
51½-inch 1.35-yard D. F.		.23
72-inch 1.05-yard D. F.		.32⅜/.33⅜
72-inch 17.21 ounce		.37⅝
Mechanicals		
Hose and belting	lb.	.31½
Tennis		
51½-inch 1.35-yard	yd.	.25½
51½-inch 1.60-yard	yd.	.21⅝
51½-inch 1.90 yard	yd.	.18¼

Hollands

Blue Seal		
20-inch	yd.	10¾
30-inch		.19½
40-inch		.21½
Gold Seal		
20-inch No. 72	yd.	.11½
30-inch No. 72		.20½
40-inch No. 72		.23
50-inch No. 72		.31
Red Seal		
20-inch	yd.	.10
30-inch		.18¼
40-inch		.20
50-inch		.29

Osnaburgs

40-inch 2.34-yard	yd.	.13⅛
40-inch 2.48-yard		.12⅜
40-inch 2.56-yard		.11⅛
40-inch 3.00-yard		.10⅜
40-inch 7-ounce part waste		.11¾/.12
40-inch 10-ounce part waste		.16½
37-inch 2.42-yard		.12⅝

Raincoat Fabrics

Cotton		
Bombazine 60 x 64	yd.	.10¼
Plaids 60 x 48		.12½
Surface prints 60 x 64		.13½
Print cloth, 38½-inch, 60 x 64		.07¼
Sheetings, 40-inch		
48 x 48, 2.50-yard	yd.	.12
64 x 68, 3.15-yard		.10½
56 x 60, 3.60-yard		.09⅜
44 x 40, 4.25-yard		.07⅞
Sheetings, 36-inch		
48 x 48, 5.00-yard	yd.	.06⅞
44 x 40, 6.15-yard		.05¾

Tire Fabrics

Builder		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.32
Chafer		
14 ounce 60" 20/8 ply Karded peeler	lb.	.31½
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.31
Cord Fabrics		
23/5/3 Karded peeler, 1 1/16" cotton	lb.	.32½
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.30½
12/4/2 Karded peeler, 1 1/16" cotton	lb.	.29½
23/5/3 Karded peeler, 1¼" cotton	lb.	.38
23/5/3 Combed Egyptian	lb.	.51½
Leno Breaker		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.34

GAINS made by the cotton market in moving to new highs during the early part of April were offset by a sharp slump after mid-month. The New York 15/16-inch spot middling price advanced from 11.35¢ per pound on March 28 to close at a high of 11.70¢ on April 3, after holding relatively steady for over a week, the price dropped sharply to close at 11.34¢ per pound on April 23. Thereafter the market was stronger, with the price closing at 11.47¢ on April 29.

Consumption of cotton in domestic mills during March set a new all-time monthly record of 854,179 bales, according to the Census Bureau. The figure compares with 793,626 bales in February, 843,000 in January, the previous record, and 627,194 in March, 1940. For eight months consumption was 6,075,096 bales, against 5,330,901 the previous season. Exports were 97,292 bales in March, against 60,597 a month ago, and 433,842 in March, 1940; for eight months exports totaled 829,992 bales against 5,350,-353 a year ago.

The Department of Agriculture announced on April 17 rates of parity payments to growers who plant within their 1941 acreage allotments of cotton, wheat, corn, rice, and tobacco. The rate for cotton growers will be 1.38¢ per pound. Payments will be made from a $212,-000,000 fund assured by congressional action. The $212,000,000 passed by the House was increased to $450,000,000 by the Senate, but this increase has been rejected by the House, and the matter will be settled in conference. It was reported that the Administration is not in favor of the increase. On March 26 the House passed the Senate bill requiring the Commodity Credit Corp. to store government-financed cotton in the area in which it is produced, and allowing negotiated instead of competitive bidding for storage contracts. Other cotton legislation developments, including new loan provisions are pending.

The Surplus Marketing Administration reports that it will use 1,033,000 to 1,133,000 bales of cotton this season for mattresses, export cotton goods, cotton bale covers, and writing paper.

On March 31 the Liverpool cotton market was closed for the duration of the war.

Fabrics

After a very active first quarter, the fabrics market was relatively quiet during April and apparently was going through a period of digestion. Industrial fabrics, including rubberizing types, were reported to be scarce; nearly all cloth manufacturers who produce wide coating fabrics are sold through September, and some mills are engaged throughout the balance of the year, it was reported. Hollands are said to be in increasing demand, particularly for use with tire repair materials. Cloth, from which hollands are made, is reported to be scarce; the few mills making such cloth have sold their goods into late fall.

The price structure continues strong, and prices in all groups advanced, with the exception of hollands, which held steady. The advance was particularly marked in the case of tire fabrics with an increase of 2¢ per pound. Two factors that may influence market conditions are the possibility of government price regulations of cotton cloth and yarn and the decision of the textile wage committee to recommend a 37½¢ minimum rate.

Synthetic Rubber Exports

For the first time the United States Department of Commerce included synthetic rubber exports in its January, 1941, figures. Synthetic rubber exports during January totaled 115,722 pounds, value $53,129, and in February, 75,955 pounds, value $44,374. The bulk went to the United Kingdom: 94,860 pounds in January and 63,342 pounds in February.

RUBBER SCRAP

WITH reclaimers operating at capacity, the demand for scrap rubber continued heavy during April. Spring weather has brought about an improvement in collections that were slow during the winter. Scrap rubber exports, during February, according to the Department of Commerce, were 9,068,163 pounds, against 8,207,934 pounds in January. In February $5,680,776 pounds went to Japan.

The market is strong, with price advances on the following types of scrap: No. 2 compound red and mixed tubes; all pneumatic tires and light gravity solid; No. 1 red, white, and mixed mechanicals; white druggists' sundries; and hard rubber.

Consumers' Buying Prices

(Carlot Lots for April 25, 1941)

Boots and Shoes		Prices
Boots and shoes, black	lb.	$0.01⅛/$0.01⅜
Colored	lb.	.01 / .01⅛
Untrimmed arctics	lb.	.00⅞/ .01
Inner Tubes		
No. 1, floating	lb.	.11 / .12
No. 2, compound	lb.	.06⅛/ .06⅜
Red	lb	.05¾/ .05⅞
Mixed tubes	lb.	.05 / .05¼
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	16.00 /16.50
Beadless	ton	21.50 /22.50
Auto tire carcass	ton	47.00 /52.00
Black auto peelings	ton	48.00 /50.00
Solid		
Clean mixed truck	ton	34.00 /36.00
Light gravity	ton	45.00 /48.00
Mechanicals		
Mixed black scrap	ton	33.00 /34.00
Hose, air brake	ton	22.00 /24.00
Garden, rubber covered	ton	12.00 /14.00
Steam and water, soft	ton	12.00 /14.00
No. 1 red	lb.	.03½/ .04
No. 2 red	lb.	.02½/ .02¾
White druggists' sundries	lb.	.04 / .04¼
Mixed mechanicals	lb.	.02¾/ .03
White mechanicals	lb.	.04 / .04¼
Hard Rubber		
No. 1 hard rubber	lb.	.12 / .14

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks—Long Tons

Twelve Months	U.S. Imports*	U.S. Consumption¶	U.S. Stocks Mfrs., Dealers, Importers, Etc.†¶	U.S. Stocks Afloat	U.K.—Public Warehouses, London, Liverpool†‡	Singapore and Penang Dealers and Port Stocks†‡	World Net Exports‡	World Absorption‡c	World Stocks†‡§
1939	499,616	592,000	125,800	91,095	44,917*a*	15,299	988,600	1,110,383	447,666*a*
1940	818,102	618,349	340,857	153,169	......	26,773	1,392,231	1,069,213	....
1940									
Jan	72,520	54,978	142,368*b*	90,285*b*	......	35,928	129,557	106,073	....
Feb.	43,088	49,832	134,328*b*	112,257*b*	......	35,563	109,178	96,755	....
Mar.	59,277	50,192	142,414*b*	113,619*b*	......	23,830	99,954	102,282	....
Apr.	70,699	50,103	162,459*b*	102,557*b*	......	42,239	110,812	100,570	....
May	51,431	51,619	161,446*b*	109,364*b*	......	32,731	110,709	94,988	....
June	53,889	46,506	168,235*b*	119,138*b*	......	32,375	109,734	78,642	....
July	69,596	47,011	190,222*b*	139,629*b*	......	36,716	134,159	75,607	....
Aug.	73,028	50,234	213,002*b*	141,286*b*	......	40,395	118,498	80,011	....
Sept.	78,973	50,206	241,358*b*	137,033*b*	......	29,069	124,864	77,978	....
Oct.	74,716	56,477	259,140*b*	166,837*b*	......	33,613	124,918	87,216	....
Nov.	72,901	54,652	276,943*b*	158,095*b*	......	33,778	104,442	84,352	....
Dec.	97,984	56,539	318,486*b*	145,950*b*	......	26,773	115,411	84,739	....
1941									
Jan.	86,833	64,225	340,857*b*	153,169*b*	......	37,163	152,418	96,925	....
Feb.	73,973	61,016	353,733*b*	136,855*b*	......	46,913	101,667	89,216	....
Mar.	87,123	66,821	373,581*b*	140,228*b*	......	......	......	......	....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡*Statistical Bulletin of the International Rubber Regulation Committee.* §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, regulated areas, and afloat. ¶Corrected to 100% from estimate of reported coverage. *a* Stocks as of Aug. 31, 1939. *b* Includes government emergency rubber. *c* Including producing countries.

THE R. M. A. has estimated that United States rubber manufacturers consumed 66,821 long tons of crude rubber during March, the highest month's consumption on record and 9.5% above February and 33.1% above March, 1940.

Gross imports for March, as reported by the Department of Commerce, were 87,123 long tons, 17.8% over February and 47% over March, 1940.

Total domestic stocks as of March 31 are estimated by the Association at 373,581 long tons, 5.6% over the stocks on hand February 28 and 162.3% over the stocks on hand March 31, 1940.

Stocks in the hands of the U. S. Government March 31 were 163,602 long tons, 12.4% above February 28 stocks.

Crude rubber afloat to U. S. ports March 31 is estimated at 140,228 long tons, 2.4% over February and 23.4% above March, 1940.

Current Quotations

(*Continued from page 78*)

Vulcanizing Ingredients

Magnesia, light (for neoprene)	*lb.*	.25
Sulphur	100 *lbs.*	2.00
Chloride (*drums*)	*lb.*	.04
Telloy	*lb.*	1.75
Vandex	*lb.*	1.75

(See also Colors—Antimony

Waxes

Carnauba, No. 3 chalky	*lb.*	.56 / .57
2 N.C.	*lb.*	.645 / .655
3 N.C.	*lb.*	.605 / .615
1 Yellow	*lb.*	.68 / .69
2	*lb.*	.67 / .68
Montan, crude	*lb.*	

Rubber and Canvas Footwear Statistics

	Thousands of Pairs Inventory	Production	Shipments
1938	16,183	50,812	54,942
1939	16,388	60,612	60,377
1940	11,129	57,278	62,480
1941			
Jan.	10,377	5,939	6,614
Feb.	10,754	5,543	5,166

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.
Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.